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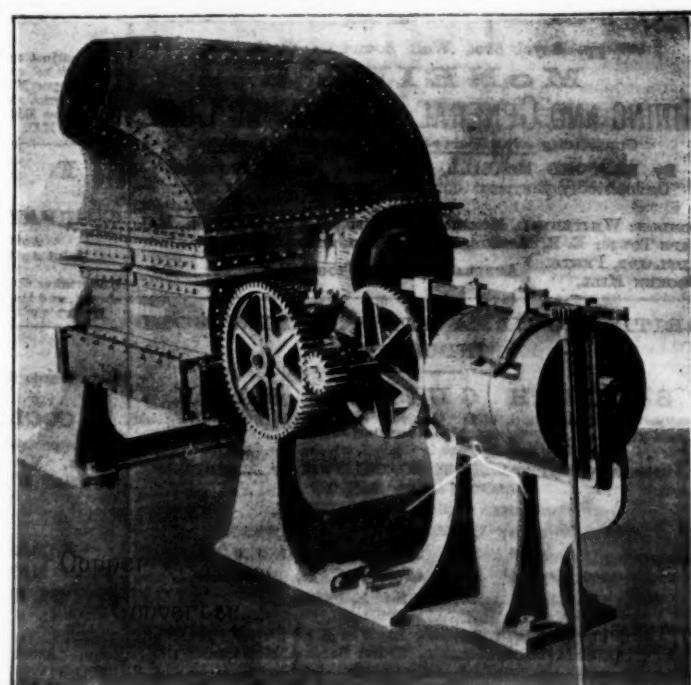
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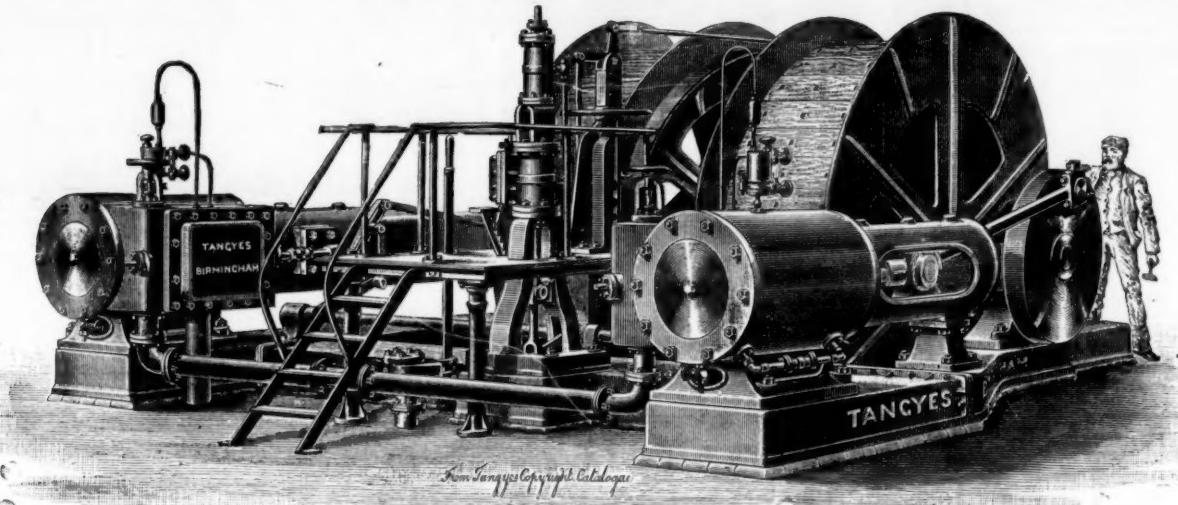
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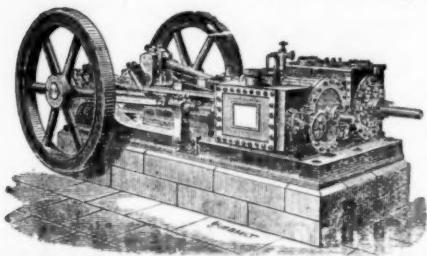
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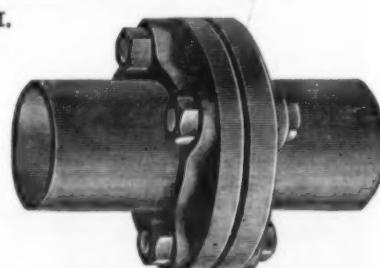
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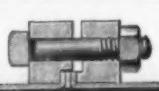
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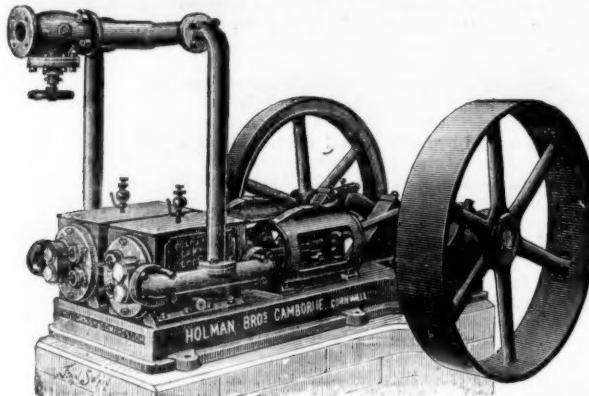
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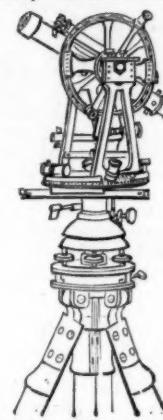
AWARDED SILVER MEDAL INTERNATIONAL  
INVENTIONS EXHIBITION, 1885.



FIRST  
SILVER MEDAL  
Highest Award,  
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Jubilee Exhibition  
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**RECORD OF WORK DONE**  
At Botallack Mine, St. Just, Cornwall, **TWELVE MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** drove, sunk, and rose **288 FATHOMS** in **12 MONTHS**, equal to five times the Speed of Hand Labour.

At Wheal Grenville Mine, Camborne, Cornwall, **SIX MEN** with **TWO** new Patent **CORNISH ROCK DRILLS** started from the **150 FATHOMS** level and put up in **EIGHT MONTHS** a **11 FEET** by **5 FEET PERPENDICULAR RISE 46 FATHOMS 5 FEET 6 INCHES**, and about midway drove **1 FATHOM 5 FT.** No communication of any kind was effected until hoisting to the Shaft brought down from surface.

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**AWARDS:** CRYSTAL PALACE, 1890; TASMANIA, 1891; KIMBERLEY, 1892.

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CONCENTRATOR TO BE SEEN IN OPERATION AT THE COMPANY'S ONLY ADDRESS:

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*The Machine is superior to Sieves for Sizing Homogeneous Substances, such as Emery, Sand, and Powders, and may be used to great advantage in the preparation of Ochre.*

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*We shall be obliged by being promptly placed in possession of particulars regarding contracts open for competition, and of the results of successful tenders. In the latter case contract prices should be given.*

*The date given is that by which tenders must be delivered, in nearly all cases further information can be obtained on application at the addresses given. In applying for such the name of "The Mining Journal" should be mentioned as the original source of the information, concerning which further particulars are required.*

#### HOME CONTRACTS.

**Coal.** January 1 (*Great Yarmouth*).—For the supply of 200 tons of good hand-picked steam coal, from the Clifton or Hucknall pits, delivered into the coal bunkers at the electric light station, in lots of about 30 tons per week, commencing January 15, to the Town Council.

**Spring.** January 1 (*India Office, S.W.*)—The secretary of State for India in Council is prepared to receive tenders to supply steel volute springs. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 p.m. on January 1.

**Reservoir.** January 3 (*Bangor, Ireland*).—For the construction of a reservoir and other works connected therewith, including the inlet drain, pipe line to join present reservoir and town pipe, catchwater drain to Little Clarendon, tanks, &c., for the Bangor Waterworks, in accordance with the drawings and specification prepared by Mr. Henry Chappell, engineer, which may be seen at the office of Mr. Francis Pollock, Town Clerk.

**Coal.** January 4 (*Hull*).—For the supply of best South Yorkshire hard steam coal during 12 months commencing February 1, to be delivered f.o.b. at Hull, or alongside their bulk *Courtesy of Erne*, moored at Gravesend, for the Steam Cutter Coal and Ice Company. Estimated quantity required 20,000 to 25,000 tons, in cargoes (by sailing vessels) of from 100 to 200 tons. Tenders to be delivered to the secretary, Mr. Robert Hodgson, chartered accountant, 16, Parliament Street.

**Waterworks.** January 12 (*Skibbereen, Cork*).—For the construction of a reservoir, filter beds, river diversion pipes, fountains, hydrants, valves, pipe laying, and all works and materials required for the supply of water to the town of Skibbereen, also a caretaker's house, for the Guardians of Skibbereen Union, according to the plans and specification prepared by Mr. Richard W. Walsh, C.E., 10, South Frederick Street, Dublin.

**Waterworks.** January 17 (*Enniscorthy, Ireland*).—For the construction of works at Fermes for the supply of water to the town, for the Guardians of Enniscorthy Union, according to plan and specification to be seen at the office of Mr. D. Kohler, Esq., Enniscorthy. Each tender to name two sufficient sureties who will be prepared to sign a bond for the proper carrying out of these works.

**Railway Construction.** January 25 (*Barry Dock, near Cardiff*).—For the construction of a new railway, about one mile in length, across Barry Harbour, at the west end of Barry Dock, and of a breakwater, about 140 yards in length, at the entrance to Barry Harbour, for the Barry Railway Company. Drawings and specifications can be seen on and after January 7, at the offices of Mr. John W. Lee, 21, Delahay Street, Westminster.

**Coal (Glasgow).**—Messrs. G. and J. Burns invite tenders for the supply of coal for their steamers at Glasgow and Greenock for six months from January 1, 1895, or for 15 months from same date. Quantity required for six months for delivery at Glasgow 5500 tons steam coal and 6500 tons of tripling, and for delivery at Greenock 800 tons tripling, or double these quantities for 18 months. Specification and terms of contract, together with a form of tender to be had on application to 30, Jamaica Street, Glasgow.

**Iron Pipes (Nelson, Lancashire).**—For the supply of the following goods for year ending December 31, 1895, for the Corporation.—Cast iron pipes, lead pipes, pig lead, sluice valves, ball hydrants, stop and bib taps, ferrules, and boxes. Full particulars to be obtained on application to Mr. James Hartley, waterworks manager, Town Hall, Nelson.

### NEW PATENTS.

LIST of APPLICATIONS for New Patents relating to Mining Metallurgical, Engineering, Railway and kindred matters, specially compiled from official sources for the "Mining Journal" by Messrs. Rayner and Company, Patent Agents, 37, Chancery Lane, London, W.C., who will forward all information regarding them free on application.

- 23598 Sydney J. Robinson and Samuel Pope, Brightside Works, Sheffield.—Improvements in openhearth steel melting furnaces and regenerative furnaces generally.—December 19.
- 23597 James Smith and Hugh Wilson Smith, 62, St. Vincent Street, Glasgow.—Improvements in apparatus for shearing channel iron bars or beams.—December 10.
- 24003 Edmund Edwards, 65, Chancery Lane, London.—Improvements in steam.—December 10.
- 24008 Thomas Henry Thacker, 7, Staple Inn, London.—Improvements in fastening handles to miners picks.—December 11.
- 24111 Albert F. L. Reusser, 77, Chancery Lane, London.—Improvements in and relating to tubular steam boilers.—December 11.
- 24114 Hadrian Bowman, T. S. McDonald and George F. Ross, 55, Chancery Lane, London.—Improved means for regulating the flow of feed water into steam generators.—December 12.
- 24208 Thomas Gibson, Robert H. Ealey and James Thorpe, 165, Wakefield road, Huddersfield.—An improved means for showing the height of water in water gauges of steam boilers or like purposes.—December 12.
- 24278 Charles Denton, Abel, 29, Southampton Buildings, Chancery Lane, London.—Method and apparatus for the production of metals and other materials in pulverulent form.—December 13.
- 24282 Henry Harris Lake, 28, Southampton Buildings, Chancery Lane, London.—Improvements in glass gauges for steam generators.—December 13.
- 24287 Christian Albert Jenson, 77, Chancery Lane, London.—Smokeless furnace.—December 13.
- 24320 Charles Albert Knight and George William Thode, 62 St. Vincent Street, Glasgow.—Improvements in feedwater heaters or fuel economisers for steam generators.—December 14.
- 24323 William Muirhead, 96, Buchanan Street, Glasgow.—Improvements in and relating to gas generators for steam boiler and other furnaces.—December 14.
- 24345 Alme Gordon and Alexander Butavent, 323 High Holborn, London.—Improvements in or relating to motors.—December 14.
- 24350 John Henry Brindley, 4, South Street, Finsbury.—Improvements in steam traps.—December 14.
- 24364 Prosper de Wilde, 185, Fleet Street, London.—Improved method of treating battery silicon from gold mines.—December 14.

#### SPECIFICATIONS PUBLISHED.

24384, Hamilton, gas motor engines, 1893; 24686, Cambell, gas motor engines, 1893; 971, Arnold, safety gear for mining cages, &c., 1894; 1770, Barter, steam boilers or generators, 1894; 1942, Thompson, steam boilers, 1894; 19672, Vane, steam boilers, 1894; 2021, Johnson, extracting moisture from air for blast furnaces and converters, 1894.

The above specifications published may be had of Messrs. Rayner and Co., 37 Chancery Lane, London, at 10d. each, including postage.

### OUR INQUIRY COLUMN.

#### TO CORRESPONDENTS.

Correspondents will please take note that all communications will be answered in this column and not through the medium of the post. All questions and replies should be accompanied by the name and address of the writer.

#### REPLIES.

G. B. S.—We are in receipt of your note, and it shall receive our attention.

SPERO.—Both securities are fairly good, but we should prefer the latter.

A. H. D.—If you buy the shares we think you would be able to take a profit; but you must be prepared to hold for some time.

HOPEFUL.—(1.) We are not aware of it.—(2.) This is, perhaps, the better purchase.

J. C.—Take a fair profit whenever you can see one.

F. N. S.—(1.) Do not buy them now.—(2.) We believe so.

M. D.—This is not an investment we care to recommend.

GRATEFUL.—Very few dealings take place in the shares, and the quotation is, therefore, more or less nominal.

INVESTOR.—We are making inquiries in the matter, and we hope to give you a reply next week.

J. D.—We are not aware of it.

S. E. M.—We know of nothing that should bring about a rise.

A. B.—If you can afford to hold it would, perhaps, be best for you to do so, but at present we think such securities are best left alone.

At a meeting of the Edinburgh Geological Society, held on the 20th inst., Mr. Richard J. Middleton, M.N.E.Inst., M.M.E., &c., Manager of *The Mining Journal*, was elected a member of the Society.

The directors of the CALIFORNIA MILLING AND MINING, in their report for the 18 months ended August 30 last, state that the balance-sheet shows that the indebtedness has been satisfactorily lessened, while the revenue account for the six months from March to August of the present year shows an actual profit of £411. There are, however, still existing some debts in Colorado which it would be much to the advantage of the company to pay off. The directors consider the improved position of the company warrants them in asking the shareholders to apply for some of the unissued shares yet at their disposal.

## THE GEOLOGICAL STRUCTURE OF THE RINGWOOD IRON MINES, NEW JERSEY.\*

By FRANK L. NASON, New Brunswick, N.J.

DURING the months of June and July of the present year the writer made a special geological survey of the mining property of Messrs. Cooper and Hewitt, at Ringwood, New Jersey. Some of the results of this survey are presented to the society through the courtesy of the Hon. Abram S. Hewitt. The magnetite iron-bearing rocks of the Archaean highlands of New Jersey and of New York and Pennsylvania, have been already described by the writer as belonging to the Mount Hope type. This rock consists essentially of orthoclase and plagioclase feldspar, grains of quartz, and occasionally octahedral crystals of magnetite, as well as numerous grains of the same mineral. The accompanying minerals are zircon, rutile, and (rarely) molybdenite. Accompanying this rock is another, which, preserving the same general physical characteristics, presents some slight mineralogical differences. The feldspar and quartz remain the same in quantity and general appearance; but the proportion of magnetite grains has appreciably diminished, and in their places the basic minerals, hornblende and biotite, appear. This rock seems to graduate from the first described type both along and across the strike. It must be rigidly excluded from the rock which in the papers referred to has been described as the Oxford type. The two cannot be confused, as their physical and mineral characteristics are easily distinguishable and are constant. The latter rocks are well developed, and are never found, in the writer's experience, in connection with the iron ore deposits of the States mentioned. In short, so striking is this fact, that they are known as "barren rocks" among the miners.

Interstratified with the Mount Hope rock at Ringwood, and in the above-mentioned States as well, are found all of the great iron ore deposits. Associated with the iron ore deposits are highly basic rocks composed of pyroxene, hornblende, biotite, and feldspar. Free quartz, except that which is evidently secondary, is rarely, if ever, found. Accompanying this bed or stratum are occasional stringers of iron ore, from a thickness of a few inches down to narrow bands where grains of magnetite are scattered irregularly among the scales of biotite, pyroxene, or hornblende, or where all four of these minerals are mingled in varying proportions. In many of the larger mines like the Dickerson, Mount Hope, the Port Oran mines, Hurdtown, &c., the lenses of iron ore lie in immediate contact with the Mount Hope type of rock or magnetite gneiss. At other mines the ore bodies are separated from this rock by strata of varying thickness, which consists almost wholly of the kind described in this paper where magnetite grains appear to be replaced by scales of biotite. This is especially true at the Peters Mine.

The position of the ore bodies in the rock is, without exception, that of exact conformatory with the planes of stratification. In other words, no beds of iron ore have been observed to cut across the plane of bedding as they would do in case of their secondary origin, either from their being of eruptive origin (an idea now obsolete), or from having been deposited in veins or fissures of fractures. It is true that in some instances the workable ore oscillates from side to side, from foot to hanging wall, or *vice versa*, and consequently lies at a steeper or a flatter angle than the country rock; but this oscillation may result from two causes. In the first place, the ore may have become too lean to pay for extraction, and being left, may give the appearance of a flattening angle; or, secondly, an unequal thinning of the ore body would produce the same result. With regard to their position, referred to a horizontal plane, it may be said that the ore bodies occupy the same relation as their enclosing rocks. The strike is generally north-east, with a dip to the south-east varying from 40° to 90°, and a north-east pitch varying from 0° to 75°. Dip and strike are more readily observed in the country rock, owing to more extended outcrops, while the pitch is more readily noticed in the bodies of ore. The shape of these ore bodies or "shoots," as they are commonly called by the miners, is very constant except as to size. They are usually rectangular. The lenses are usually compressed in places along the line of pitch. In fact, a shoot of ore may be likened to a series of elliptical lenses, fused or welded together at the extremities of their major axes.

For any given outcrop of ore there may be, and often are, more than one shoot of ore. In the Peters Mine, at Ringwood, there are three such shoots. This general description will apply in every particular to the deposits at Ringwood. Except in a few structural points, composition of ore, size of shoots, &c., the description of one mine would apply to all. At Ringwood no one of the ore bodies has yet been completely exhausted. There are 12 mines which have been large producers, some of them with histories reaching back 1760. All of them are now idle, so that no inspection of their structure is at present possible, save in those mines which are more or less open and above the level of standing water. From the study of the Blue, Little Blue, Cannon, London, New Cannon, Bush, and St. George Mines, the following facts can be stated.

The central part of the lenses usually carries the more solid ore. At the upper and lower edges of the lenses, especially the lower edges, the ore is gradually replaced by heavily basic minerals, such as black pyroxene, hornblende, and biotite, with thin stringers of iron ore. At these edges and at the contact of the lenses with the footwall, the ore begins to be, in many places, heavily charged with almost pure phosphate of lime, in compact granular masses. The thickness of the ore bodies or lenses, measured from foot to hanging wall, varies from 6 to 50 feet. From cap to bottom rock the distance is not so easily determined, but in the case of the Peters Mine the major axis of the section measured about 100 feet as a maximum.

Peters shoot No. 1 was worked for a distance of 900 feet on the pitch of about 35° to the north-east. At the bottom the ore is reported to have grown very lean in places, and the vein, without diminution in size, to have divided into narrow stringers of ore, interbanded with strings of biotite, pyroxene, &c. At this point the work was abandoned. The Hope Mines, about 2400 feet to the north-east of the Peters Mine, have not been worked for a long time, and little information can be gained of them. From what could be observed at the surface, and from the examination of the waste heaps, the characters of these deposits do not differ essentially from those of the mines described. At the Blue Mine group a very different set of conditions prevails. In this group there are eight distinct mines. All of them, with one exception, have a dip of 90°. The pitch is 60° north east. The great difference in the effect of the pitch in these two groups of mines may be more readily appreciated if the statement be made in another form. On a pitch of 35° the ore goes underground at the rate of 1.5 feet in 2 feet, while on a pitch of 60° the ore descends at the rate of 3 feet in 2 feet. The one exception to the rule of the Blue Mine group is an unimportant opening near the Cannon Mine, where the pitch is 45°, the dip remaining the same.

Between these two groups there are three mines which do not fall into the other groups, and do not form a group by themselves. These mines are, beginning at the Blue Mine group, the Bush, the Keeler, the Miller, St. George, and the Cooper Mine, just south of the Peters. The dip of the Bush Mine is 70°, pitch 45°, of the Keeler, Miller, and St. George (all on the same line of attraction) the dip is 63° and the pitch 40°, while the dip and pitch of the Cooper are about the same as that of the Peters group. Thus these intermediate mines seem to be, in some way, the connecting link between the two groups of mines described. The reason for this assumption will be pointed out later on. The mine rocks accompanying these two groups are as noticeable as is the difference in amount of pitch and dip. In the Peters Mine group there are occasional small stringers and bunches of pegmatite granite, but the total amount is small, as compared with the regular mine rock. This rock (the mine rock) is not badly crushed and broken, but as the great length of the ore shoot seems to indicate, reaches for long distances little broken. While granite appears on the sides of both Whaleback and Hope mountains, it is not in great abundance. Though in places it is difficult to make out either the dip, pitch or strike, yet when either or all of these are observed, they do not depart more from the normal direction than might be expected in such rocks. No minerals are found in the mines, except those which have already been mentioned as occurring in such ore deposits.

At the Blue Mine group there is a very decided difference. The mine-rock is shattered and broken; the ore shoots are faulted and slipped, and are bent aside from their normal strike for short distances. The crevices of the shattered mine rock are filled with coarse pegmatite granite. A bright salmon-coloured feldspar occurs in great masses, and large pyroxene crystals from 1 to 6 inches in length are formed, partly in the quartz and partly in the feldspar. In the clear, glassy quartz are frequently found large tubular crystals of orthoclase. In the slips or "vugs" of the mine rock and of the country rock adjoining, the following minerals, in small but very perfect crystals, have been found: flesh coloured stilbite in large radiated clusters; epidote, crystalline, massive, and in small but very fine crystals; heulandite in tabular crystals; calcite or dog tooth spar, "bergkork," "mountain leather," asbestos and rutile. These minerals are all of secondary origin, and their constituents were derived, probably, from the decomposition of the containing rocks under the combined influences of heat and pressure.

The surrounding country rock is also much broken and displaced by granitic rocks. Along the south-western side of the mines, nearly parallel with the brook, the granites are also very abundant. From this point, and running nearly due north along the western slope of mine hill, granite seems to be the most abundant. At this point nearly the whole surface is covered with soil, and the nature of the rocks cannot be determined. To the west of the wood road, south-west from the mines, the same thing is true. The ground here is swampy. In spite of the abundance of granite and the crushed and broken appearance of the gneiss in the vicinity of the Blue Mine group, careful observation shows a very decided and persistent structure. Beginning here the rock shows a decided parallelism as to strike with that of the Bush Mine. Although the outcrop is not continuous, occasional spots are bare of soil, showing a persistent and tolerably regular strike. At this point the strike of the rocks begins to bear to the eastward, and they have nearly a north-west south-east strike. There is a very prominent outcrop at this point, the rocks projecting from the surface to a height of about 12 feet.

The Peters Mine group, the Keeler and St. George Mines, and the Blue Mine group, were originally in the same horizontal plane or bed of iron-bearing gneiss. They were afterwards folded, making a sharp synclinal at the Blue Mine group; an anticlinal, in the western slope of which lie the Keeler and St. George Mines; an a synclinal fold, on the western slope of which lies the Peters Mine group. Afterwards, or during the process of folding, the rocks were faulted or broken in a north-west south east direction, and the folds given a tilt or pitch to the north-east. Finally, partly by weathering, but more largely by glacial action, these folds were reduced to their present contours.

It will doubtless be noted in this connection that all of the iron beds cannot possibly be aligned in the same single stratum. In the Blue Mine group, for instance, the Blue Mine and Mule Mine form a tolerably correct alignment, while nearly parallel, and separated by only 90 feet of rock, lie the Little Blue and Red Mines. Again, on the western side of the group, the Cannon and London (the two are practically one and the same shoot of ore) are parallel to the New Cannon. Farther to the north-east the Bush Mine is separated by about 100 feet of rock from a series of openings to the south of and nearly parallel to it. If, now, we should flatten out the fold of the Blue Mine group we should find the Blue and the Little Blue lying on one side of a plane or a stratum of rock, while the Cannon and London would lie on the other. The Blue and Red Mines would be separated vertically by at least 90 feet of rock. This would simply mean that during the deposition of the iron-bearing strata, conditions were successively favourable and unfavourable for the deposition of beds of pure magnetite. If, now, we refer to the Peters Mine group, we shall see that Mine 8 (the Cooper Mine) is separated from the Peters Mine by a distance of about 500 feet. This would mean that the iron ore-bearing strata are in this place at least 800 feet in thickness, and probably much thicker.

The Blue Mine group is the only one represented along the line of section and at the present surface. The reason for this is quite evident. Carrying the Keeler and St. George Mine out to the line on the angle of pitch, they would intersect the vertical plans of E F at about 1000 feet above the present surface. The trough of the Peters synclinal would intersect the same plane at an altitude of about 700 feet. The Peters ore shoot, if carried to the point of intersection with this same plane at the angle of its present pitch, would intersect this plane at a height of about 2300 feet above the present surface. It is, therefore, assumed that the rock which actually reaches the surface along this line is the barren substrata. As has already been pointed out, this is not a baseless assumption. A careful study of dips, strikes, and pitches warrant this conclusion. Again, the fact that no apparent deposits of ore are found from the Peters Mine around the curve and to the St. George Mine does not militate against this theory. It only forces us to either of two conclusions. First, that there are no deposits between these two points; or, secondly, that such deposits exist but are too deeply buried to manifest themselves either to the eye or by means of a dipping needle.

At the Blue Mine group, as has already been stated, the pitch of the ore bodies is 60°. The section line crosses this group 60 feet from the southern points of the group. On this pitch the mines at the section line ought to beat a depth of 1155 feet. At the point of intersection they come to the surface, or at least there are ore deposits at the surface. One of two conclusions must certainly be accepted in this case. First, that there are several shoots of ore lying one above the other, as is shown at the Peters Mine; or, secondly, that the same shoots of ore are repeatedly brought to the surface by faulting. From an *a priori*

standpoint the first position is as tenable as the second. Even by analogy there are facts to warrant this conclusion; for it is indisputably true that there are many mines in the State where it is very evident that there are several shoots of ore lying one above the other, as at the Peters Mine. Taking all of the facts together, however, the second conclusion seems to be the more tenable. The strongest point in favour of this is the fact that at the Blue Mine the pitch is 6°, while at the Bush Mine, 900 feet distant, the pitch is 43°. Several test pits, less than 500 feet distant from the Blue Mine, show a pitch of about 40°. This sudden and great change in the amount of pitch, taken in connection with known slips or faults in the workings of the older mines (the Blue, Hard, Mule, Cannon, &c.), and the generally disturbed condition of the rocks, makes the second conclusion almost the only admissible one.

Between Whaleback and Hope Mountains one would naturally expect to find some evidence of faulting. If faults do exist, however, they are south of the Peters Mine, and the evidence is deeply buried beneath glacial drift. There is certainly no evidence of faulting, except on a small scale in the Peters Mine. This shoot of ore has been worked for 900 feet on the slope. Along the eastern slope of Hope Mountain there are numerous openings so related to each other as to suggest the possibility that each was but the faulted end of the other, by this means successively brought to the surface. However this may be, there are no signs of such faults, either in the small workings, or in the extensive rock outcrops on the mountain.

To sum up briefly in regard to the structure of the Ringwood Mines, it is shown that the Blue Mine group lies in a tightly compressed synclinal fold, which pitches to the north-east; that the St. George and Keeler Mines lie on the western slope of an anticlinal fold; and that the Peters Mine group lies on the western slope of a syncline. These folds are overthrust-folds, so that all of the mines are either vertical or have a south-east dip. It is further shown that the Blue Mine group is broken by faults, and that, probably, no such faults exist in the Peters group. The thickness of the iron-bearing strata is upwards of 600 feet.

The practical conclusions which may be drawn from these facts are as follows: In the first place, if it is true that the anticlinal and synclinal folds reached the vertical elevation, the Blue Mine group must have also suffered erosion in the same proportion as the others. The outcrops of this group show that when denudation ceased, it left surface outcrops of large dimensions. It would seem tolerably safe to conclude that at least 50 per cent. of these large shoots were swept away. Secondly, the Blue Mine group is probably very near the bottom of the iron-bearing strata. Add to this the fact that the rocks are badly shattered and faulted; and it is doubtful if any large deposits of ore are left. There may be some comparatively large pocket-like deposits, but none of them would be apt to exist of sufficient size to warrant either extensive prospecting, shaft sinking, or expensive plants to win the ore.

Thirdly, while the Bush Mines, together with the St. George and Keeler have not the points which make against the Blue Mine group, yet their positions in the fold are such as to make prospecting very difficult and precarious, at least except within narrow limits, close to the known ore bodies. Fourthly, the conditions which make prospecting undesirable at the above-named localities are all reversed in the Peters group. Here the long reach of ore-bearing rock which stretches for over 3300 feet along the eastern foot of Hope Mountain seems to give promise of other ore deposits than the Peters Mine, which has been a large producer for so long a time. The steady pitch and dip of the outcropping ore shoots and the enclosing rocks give exceptional advantages to the engineer for calculating the depth to which either drill holes or test shafts would have to be sunk in order to prove any given outcrop. In addition, the chance is by no means small that among these numerous outcrops there may be large bodies of ore which make no surface showing.

The junction of two or three of these shoots beneath the surface (and there are indications that the Hope Mine shoot will thus run into the one south of it) would seem almost sure to result in an enlarging of the jointed shoots to a workable size. At least, if business conditions ever resume a more favourable aspect, the chances of success will warrant the outlay for prospecting.

**THE SULITELMA MINES IN NORWAY.**—Although the Sulitelma mining district has been known to possess rich deposits for some 20 years, the difficult natural conditions for transport prevented their being worked, and it is only within the last few years that an energetic Swedish company has taken the matter thoroughly and rationally in hand. The mines are situated on both sides of the mountain lake Langvond, and much preparatory work of varied nature was done prior to work being taken in hand, nor has there, in any respect, been omitted anything which could bring the large installations in every respect up to date. It seems proved beyond a doubt that the Sulitelma mines are the largest and best copper mines in Scandinavia, and that they, in all probability, can be extensively worked for centuries without being exhausted. The quality of the ore is excellent. The copper-carrying sulphur ore not only contains a large percentage of copper, but a small one of zinc, and is remarkably free from other impurities, so that, for instance, 10 per cent. salt is sufficient for completely chloridising the Sulitelma ore, whilst other ores containing the same percentage of copper require 17 per cent. or more for that purpose. The cement copper is completely free from arsenic, antimony and bismuth. The auxiliary product, purple ore, contains 60 per cent. of iron, and is so free from impurities, that it commands a price of 12s. to 15s. per ton at iron works. The railway between Helarmon, at the Langvondet Lake, and the Skjöntuen at Overvand is now completed, and although it is only some 8 miles long, it can probably lay claim to being unique in Europe, the natural difficulties being quite exceptional. A number of hands have been drawn from Sweden, from the districts of Koikkjokk and Jokkmokk, and also from Finland a number of men have found employment at Sulitelma.—*Engineering*.

**POORMAN CONSOLIDATED.**—It is proposed to at once transfer the property of the company to a new English company, to be called "The Poorman Gold Mines (Limited)," fully paid shares of which will be given in exchange for those held in the present undertaking. The debts of the company amount to about £13,000, and as it is necessary to raise £17,000 for purchasing and constructing a new mill, and for providing working capital, £30,000 of debentures are to be issued. Of this amount, £3000 will be taken in part payment of the American debt. The debentures are to carry 10 per cent interest.

**THE INDIAN ENGINEERS' DIARY AND REFERENCE BOOK.**—We have been made the recipients of a copy of the 1895 issue of this useful publication, to which the subscribers to *The Indian Engineer* are annually presented, and we are able again to congratulate our contemporaries upon the style and form of the diary. While the work could hardly fail to be of the highest utility to all into whose possession it might come, it will be invaluable to Indian Engineers. All interested in our Indian possessions will find here an encyclopaedia, in a small way, of their Government, postal system, railways, and populations. The work is so well known that any extended notice of it would be superfluous. It is only necessary to say that this last issue compares favourably with all preceding ones.

The Bechuanaland Exploration Company announces that as it has always held its general meeting after that of the British South Africa Company its shareholders will not be called together until early next month.

\* From a paper delivered at the Bridgeport meeting of the American Institute of Mining Engineers.

## MINING IN SPAIN (ASTURIAS).

## COLLIERIES.

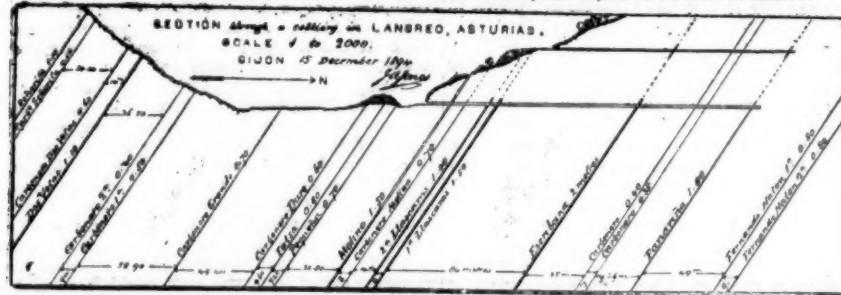
(Continued from page 591.)

GIJON, DECEMBER 15.

WHEN the small owners work good coking seams, if they cannot sell their washed small to an advantage, they keep it, and make coke. This is readily sold, and although they only produce a maximum of 54 per cent. of coke, of the weight of the coal employed, the favourable difference in the selling price and facility of sale, recompenses them for their serious loss of small coal. Then, again, they are able to sell any excess of breeze to the lime burners and brick yards. The coke they produce is bright and hard, high in resistance to crushing strain, and low in ash percentage. It is sold for foundry purposes, and very well esteemed.

Some of the mines of these small owners are nearly exhausted in their top coals. When this period will be reached, the mines will be stopped, and ultimately abandoned, owing to want of capital and knowledge to put down pumps and winding engines, so as to continue down their exploitation.

One of these owners, within the writer's knowledge, has already reached this point, and he will soon stop. Another has worked out the top coal in some of his seams, and abandoned them. He carried down work by shaft on the underlie of a strong seam, to a depth of 80 metres, and stopped for a reason that will be noted below. The run of the seams within his boundary is between 900 and 1000 metres; they dip to the south at an angle of about 33°. The writer has had special facilities for studying this property, and the following section across the same will help to show the dip and thickness of the seams and their horizontal distances one from another.



Each seam has its name, and this name is general to it throughout the collieries where it is met.

The seam "Molino" has been his source of supply for a long time. It gives about 65 per cent. of lump steam coal, 10 per cent. of nuts for house coal, and the balance small coal. A splendid clean seam, free from faulting, with a strong sandstone roof and floor; economical to work, owing to little crushing, and, consequently, a low consumption of timber. After exhausting the top coal in this, he followed down in it, as already stated, 80 metres by an underlie shaft, and worked it out to that depth eastwardly to his boundary, a distance of 300 metres (nearly). Then he started to work in the opposite direction, but within 50 metres of his pit the Langreo Railway crosses his property, and from very "cussedness" the directors ordered him to stop. He did not feel disposed to fight them, therefore he crossed his arms, shook his head, drew his pump, and started to cultivate the lands he had purchased with his surplus from working the colliery. He had not the necessary spirit, as he is getting old, nor the capital necessary to crosscut into the other seams, and to continue drawing coals. He is now waiting until some one, more mighty than he, comes to take these off his hands. These details are entered into respecting this colliery, as they tend to illustrate pretty fully the position of the small owners, and how the coal is met with in this field. The seams marked in the foregoing section have all been proved, measurements have been taken from exact data, and work is proceeding in them in the collieries lying east and west of the above one. Some of the following details have already been given in *The Mining Journal*, but they will bear recapitulation. In order to form an opinion respecting the quality of these coals, we take the results of official assays on a large scale made by the Commission of Government Inspectors at the Ferrol Arsenal. They are as follows:—

Physical Characteristics.—Colour: Brilliant black.

Composition: Compact lamellar.

Lustre: Resinous.

Hygrometric water absorbed in 24 hours .. Water and hydro-carbons eliminated at 100° C.

Medium density .. 20 pieces, weighing 20 kilograms, introduced into a drum, and revolved 90 times in three minutes, produced of small.

Carbon consumed from the commencement of ebullition to the termination of the assay at the end of three days .. Water evaporated during the test ..

Time occupied .. 11,805 kil.

Water evaporated per kilo. of coal .. 15 hours

Ash obtained .. 7,856 litres

Scoria obtained .. 1,68 per cent.

Siftings obtained .. 0,402 per cent.

Soot obtained .. 6,158 per cent.

Assayed one gramme of coal to 30 of litharge, a lead button was obtained weighing ..

Equivalent in calories .. 0,398 per cent.

One gramme of the soot with the same quantity of litharge produced a button of lead weighing ..

Equivalent in calories .. 25,500 grains

At the same time the coal was tried in a heating furnace, and it gave as good a result as that considered the best in general use.

The steamship *Congress*, about 1600 tons burthen, was engaged over a period, running from this port to Cadiz and the Mediterranean with coals. In order to secure a practical opinion as to the general quality of Asturian coals, the writer requested the captain to furnish him with some data, with the following result:—

This steamer in her runs worked 62 hours without any necessity of cleaning her fires. The consumption is larger than that of best Cardiff coals, as for every 9½ tons of Cardiff she used 10½ of Asturian.

There is no smoke in consumption, the only requirement for its perfect consumption: care in regulating the draft, to avoid waste by unconsumed carbon being carried up the funnel. His chief engineer (Mr. Leslie), who has been nine years in this ship, says that this Asturian coal is the best that he ever used in any ship. He is a man of lengthy experience, as he was previously engaged for years in the steamers of a Leith firm, run-

ning on the China coast. Independent of results obtained by the writer in stationary engines, enquiries in all directions confirm this opinion absolutely, and it may be looked upon as a good steam coal.

In addition to the general seams yielding this, there are others, excellent for use in the manufacture of gas for lighting purposes, amongst them, some of Cannel coal.

The great drawback in the working of this field on a large scale has been the excessive railway tariff, and the want of a good port with shipping facilities.

The former will be compelled to cede a large reduction, as competing metre gauge railways, to be constructed next year, will otherwise take their traffic from them, and the "Musel" new port here is being pushed forward with all speed. When this new stage in the life of the province is reached, these collieries will leave their mark on the markets, and the importation of fuel from Great Britain will receive a serious check, and as ere long Bilbao iron ores will be a diminishing quantity, outward freights of fuel to that port must rise. Then there will be no further competition between Great Britain and Asturias for the supply of coal and coke to that place, which to-day is the principal consumer of that material in this country.

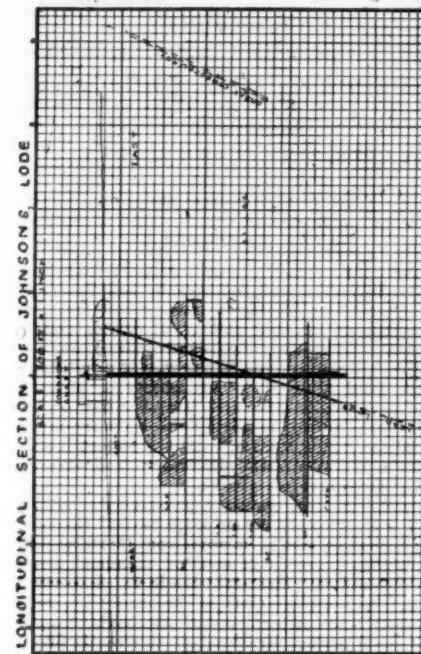
The facilities for loading in the new port and Aviles will also cheapen freights to the Mediterranean, and place the colliery owners in a position to compete there with foreign coals. In view of all this, there appears to be a rosy future before them.

The next communication will deal with the eastern portion of this province.

METROPOLITAN GOLD MINING COMPANY.—It is proposed to increase the capital from £100,000 to £165,000—30,000 shares to be offered to shareholders at 30s. per share, in the proportion of 30 for every 100 held; 14,000 to be allotted to the Rand Mines (Limited), for the acquisition of seven claims; 4300 to be under option to the Rand Mines (Limited) at 30s. per share; 700 to be taken up by guarantors at the same price; 3500 to be allotted to guarantors as commission, and 12,500 to be held in reserve.

"A band of music paraded the neighbouring town of Callington from an early hour, and flags and banners were displayed from the houses of the principal inhabitants; in fact, the day was kept as a general holiday. About 300 sat down to an excellent dinner, and everything went off with the most perfect success." —Callington, May 13, 1869.

The new company was well supplied with professional opinion, for special reports were made on the prospects of the mines by the following mine captains and others:—Captain Henry James, of Redruth; Captain Richard Rich, of Bodmin; Captain T. Richards, of Hingston Down; Captain W. B. Collom, of Okel Tor; Captain John Simmons, of the Duchy Office; Captain William Verran, of Wheal Mary Florence (15 years agent in Holmbush Mine); John Buckingham, miner; Richard Pearce, miner; John Spargo, miner. These reports, which are all of a laudatory character, were printed at length in *The Mining Journal*. (Vol. XXXIX., p. 326.)



The position and prospects of Redmoor Mine are well described in a circular by Watson Brothers. (XXXIX., p. 329.)

Redmoor.—When Holmbush was worked some years ago, the engine drained Redmoor 125 fathoms deep, and good parcels of lead and copper ore were sold, the former at £20 per ton. When Holmbush stopped Redmoor was flooded, and operations were transferred to another part of the sett, to cut the Wheal Florence lode, and work the Tin lode. Holmbush is now going to work again with a 70 inch engine, which will again drain Redmoor 120 fathoms deep, and in a month's time enable the Lead lode to be worked 40 fathoms below the adit. The Tin lode can also be worked in the 40. But more important still, the Kelly Bray lode, according to the agents' report, dips into Redmoor, and runs through the whole sett below the 60, and this can be worked dry in Redmoor. The discovery in Kelly Bray is already making a large monthly profit, and Holmbush and Kelly Bray United shares (12,000) are selling at £4 per share (£1 paid). Redmoor, to which we have stuck for 10 to 15 years, is now in about 4000 shares (several pounds paid), and selling at about 10s. with a call of 5s. made last week paid. With such points in prospect, however, we think they can scarcely remain at such a price. No part of Redmoor sett has either been lost or given up."

During 1870 the new company were hard at work unwatering the Holmbush Mine. The 60 fathom level below adit was reached by October. The engine at Holmbush was a 70 inch cylinder beam engine, with 10 feet stroke in the cylinder, and 7 feet 6 inches in shaft, and 19 inches pitwork. The water was kept down at under four strokes a minute.

The upper levels of Holmbush and Kelly Bray were now worked for mundic or arsenic ore. The old miners had put no value on it, and in searching for copper had left the arsenic ore in the mine. A good deal of ore was found on the stulls, and the results of the working exceeded the expectations with which the mine was re-opened. In Vol. XL., p. 848, a correspondent describes a visit to the mines, and expresses pleasure that the views of the pessimists who said that the mines would never be re-opened, had been falsified. He said that the mine "was employing a hundred English youths, besides a large number of miners, smiths, and carpenters."

At Redmoor only the upper levels were being worked in 1870, and dissatisfaction was expressed by shareholders in the management. The mine appears to have been paying costs. A new lode about 30 fathoms north of the Count House shaft—a kindly lode—was discovered this year. The manager of Redmoor at this time was Captain Francis Bennett, or Bennetts. 72 men were employed. (Vol. XL., p. 1062.)

In 1871 Redmoor Mine continued to be worked at shallow levels. The reports show that most work was done at the 25 fathom level. What lode was being worked is not quite clear, but from a letter of a correspondent it appears that the lode worked was not the Johnson's lode, which is now the deepest and most important tin lode on the property, but a lode further north. I have often heard it said by old miners that in former years a good tin lode had been worked in the north part of the sett, and probably the tin raised in 1871 came from this place. One of the weekly reports (Vol. XLI., p. 243) gives data from which the yield of the lode may be calculated. It says that 30 fathoms of ground were stoned during the month, and that 3½ tons of tin were produced, the lode being 20 inches to 2 feet wide. Assuming the 30 fathoms to mean square measure, this would work out to 48 lbs. of black tin per ton of ore, or 2·16 per cent. The identity of the lode is rather an important point, as the north lode has not been worked, judging from the plans of the mine, below the 25. As the letter above referred to contains important evidence on the point, it is worth giving in full. The author is, of course, speculating whether the lode worked at Redmoor would come into the Holmbush sett:—

## HOLMBUSH AND KELLY BRAY MINES.

SIR.—I beg to offer a few remarks respecting these mines. One part of the sett, commonly known as Higher or North Redmoor, was worked for lead only, no attention being paid to either copper or tin; at present it is not working for anything, and yet drained to the 60. In this part of your sett you have three very important points:—

Firstly, between this and Hitching's shaft at Holmbush there is nearly 100 fathoms on the Lead lode unexplored from surface, and levels driven from the shaft north at every 10 fathoms, and

the water drained 90 fathoms under the surface. At the present price of lead this would be a first-rate speculation of itself.

Secondly, the Redmoor Company, working on the Tin lode that is about 40 fathoms from your boundary at surface, it is underlying north over 3 feet in a fathom. At this point you have 87 fathoms of backs dry, so this lode should be in your sett at the bottom level that is now dry, and cut in every level under by prosecuting the Lead lode.

Thirdly, the Kelly Bray Copper lode has not been seen west of the great crosscourse since the commencement of the present company. This lode is also cut at every level by prosecuting the Lead lode. All the cost to get in any of these levels would be dropping down a few ladders. Taking these things into consideration, in addition to your present workings, I have reason to believe that with a small outlay it will make one of the best paying mines in the neighbourhood.

Callington, 1871.

JOHN BUCKINGHAM,

(Vol. XLI., p. 151.)

(To be continued.)

## MINING REPORTS AND MINE SALTING.

By WALTER McDERMOTT.

(Continued from page 1407.)

### MINE SALTING.

THERE are all degrees of "fixing a mine": from the legitimate showing of its best features by not taking out all the rich ore before offering for sale, or by varying degrees of skulduggery up to palpable salting of mines, dumps, and expert's samples. In the less illegitimate stages much can be done, and very frequently is done, in the way of a judicious stopping of faces in good ore, and by the observing of a discreet silence as to past weaknesses and irregularities of the ore deposits. In such cases it is simply the ordinary commercial position of "let the buyer beware," and the expert has to show by his report if he has experience, observation, and sense enough to form a sound judgment as to value.

In a mine which is thus carefully prepared for selling, it is not at all uncommon for the owner to go beyond the legitimate limit already indicated, and to misrepresent facts by filling up or concealing old workings which would, if examined, produce an unfavourable impression. The next step in the downward path which leads to a hotter place (but in the meantime also sometimes to affluence) is the scooping out of the inside of apparently solid blocks of good ground by openings afterwards filled up or timbered over. Some of the most experienced mining men and engineers have fallen victims to this and the previously described course of conduct; while some have just escaped being caught by a mere accidental indication of the fraud, or by "peaching" of some miner who helped in the work and had not been squared. Naturally the danger from the sources mentioned is much less in new mines of limited extent than in old mines extensively developed. In a mine which has been worked for some time the visiting engineer is at a great disadvantage as compared with the men who have worked in it for years, and perhaps devoted their greatest skill to making not only a good record, but to concealing the exhaustion which is approaching. It happens occasionally also that the owners complete their work, by "picking the eyes out of the mine," in the interval between the expert's report and the turning over of the property to the purchasers. The richer the nature of the pay ore in the mine, the greater the danger from this piece of rascality, which needs specially providing against in the terms of purchase, and by other precautions.

The above-mentioned very real and not uncommon dangers, against which the engineer has to guard, are not, however, "Salting" in its proper and technical sense, which is generally understood as covering any interference with the expert's chance of arriving at a true estimate of the value of ore. The salting may be done on the ore before the expert's arrival, or during his sampling, or on his samples when taken, or while panning or assaying.

Although cases are well known of faces in a mine being salted wth such success as to catch the unwary, this form of salting is usually too difficult to carry out, and too superficial in character to offer much chance of catching an old bird. With ore dumps and alluvial deposits it can be done with better chances of success but is naturally of an expensive nature if carried out on a really systematic plan. Cases are on record of successful salting of alluvial ground with precious stones as well as with gold, and the expert must clearly be on the watch against this, when circumstances allow of the possibility of its occurrence. With ore dumps it is often very easy to arrange a veneering of good ore over a very large pile of poor or barren rock, and then when the ingenious gentleman who takes samples "at random" comes along he will be sure to obtain a gratifying result.

A good many years ago I made the personal acquaintance of a prepared property on Lake Superior. It was a home made tin mine. There had been rumours of valuable discoveries of tin ore on the north shore, where I was then living; and late one autumn an expedition from the United States went to report on it, taking an experienced Cornish mining captain for the necessary technical knowledge. A very glowing report was issued, and a company formed; rich samples were exhibited, and some tin run out of them and melted into spoons, which were presented to the fortunate shareholders. At that time the north shore was inaccessible for six months, except by a 200 miles tramp on snow shoes to where I was, or 350 miles to the tin property, so the excitement grew during the winter, from the enchantment which distance lends. The report and the news of the excitement reached us in course of mail, and I was sent with an expedition and a land surveyor to report on the properties and take up land adjoining before navigation opened, and before anyone else could reach the spot, which needed only 150 miles of snow shoeing for us. A good deal of ingenuity and work had been expended in making a tin vein, and a township had been surveyed in anticipation of the future rush for land. Some natural cracks in the country rock true fissure veins which Nature had overlooked when the mineral solutions were ladled out, had been filled up with a mixture of broken tin ore from Cornwall, copper tailings from Lake Superior, and soluble silicates for cementing material. In the camp of the promoters we found a barrel of the soluble silicates used. In the meantime, the idea of the value of the discovery had grown so much that it seemed necessary to sell the property in London; the United States could not hold it, and a financier—who was really a believer—was sent across the water. Curiously enough he applied to people for whom I had previously made reports, and on my return to head-quarters, with the principal vein in my possession, I found a cable asking me to report how many millions it was worth, which I was able quickly and accurately to determine. Some years later in Colorado I was introduced to the gentleman who planted the deposit with the explanation that I was the individual who had taken away his best lode in a small boat. The circumstantial

report by the Cornish mining captain I have since heard explained by the fact that he was not accustomed to the particular brand of champagne used on the expedition.

My first report on a silver property in the same country was not calculated to breed confidence in mining methods. I had left England with a full report by a Government surveyor of the mine and its riches, but the claim was covered by the virgin forest: not a sign of outcrop or working; nothing to sample. There was nothing to report on but a magnificent crop of black flies and mosquitoes. The sanguine Government surveyor had evolved his description out of his inner consciousness, and aided by a 10 feet shaft on a small vein on an adjoining property. Since that time I have never felt a blind confidence in Government surveyors as mining experts.

The salting of samples is, however, much more common than any other form of getting ahead of the expert. It is less expensive than salting in advance, more deadly, and can be nicely adjusted to circumstances and to the individual weakness of the victim.

When the owner of the mine, or anyone connected with him, is allowed to assist in the sampling itself, there is no lack of opportunity with some ores for the artful salting while in the mine; but as a rule engineers do not have the requisite faith in human nature to accept such assistance, unless the character of the ore and kind of samples required make salting impossible at the time. In a strange district where assistance of some sort has to be obtained in breaking and transporting large samples, and the character of such assistance is not absolutely certain, the engineer must guard himself by duplicating entirely alone certain test samples. Assuming that samples have been secured without any chance of outside interference, the business is by no means ended, for the enterprising salter will follow those samples until actually panned or assayed, or taken out of his reach. I propose to illustrate some of these special dangers by the aid of a few personal experiences which will show that neither keeping samples locked up or sealed, or delivered to post office or Express Company, will insure absolute protection in all circumstances. In fact, to paraphrase a patriotic maxim, it may be said that "eternal vigilance is the price of freedom from salting."

To the successful cultivation of the art of salting no great knowledge or experience of mining is necessary, any more than a study of architecture is essential to the practice of burglary. True ability will assert itself in this as in other employments by the invention of new means to meet special cases, and by a proper discretion in regulating the dose of salt administered to the temperament of the patient. Sometimes the honest miner will freely relate stories of methods by which experts had been salted, implying delicately that no such schemes would be successful with his hearer, but reserving one, undescribed, for purposes of personal illustration later. As an example of the unexpected which may occur after samples have been safely removed from the mine, I may refer to a case in the Rocky Mountains, where I had taken some samples to the nearest town and made arrangements with the local assayer for the use of his office. I preferred to make my own assays, not from any chance of his knowing where the samples were from, but rather from a distrust of his somewhat rule-of-thumb methods. I allowed his brother professional to continue his work while I did mine; and, although apparently quite satisfied that I should pay him for the assays and do the work myself, his feelings must have been injured, for he doctored my samples without any other possible motive.

This inhospitable action caused me some annoyance and extra travel, but otherwise fortunately had no serious results beyond somewhat lessening in me the proper Christian belief in one's fellows.

It is remarkable how generally the elementary knowledge of salting is distributed over the earth. Wherever mining is, there the salter is likely to be developed, regardless of differences in climate, language or religion. The art is not unknown in England. Not long ago I was asked to look at a gold placer in Wales, and though I should not have picked the country myself for exploring purposes, the terms offered left all the risk on the other side—so I went. The owner took me over the ground, and I industriously panned in all the likely spots pointed out with never a colour to cheer my heart. The owner delicately intimated that perhaps I was not much of a hand at panning, and, further, that my gold pan was a poor contrivance. He thereupon sent up into the mountains for a certain Welsh mining captain, who duly came down with a Mexican wooden batea, and promptly produced good prospects from various places. He was so very skilful that when I gave him a sample of my own tailings from tests before he arrived, without mentioning their source, he got a fine healthy show of gold even from them. When I mentioned that he had been working on what I washed off without getting a colour, the Welshman was so confident of the fault being on my side, that I took half of the next sample he was about to wash and showed in my pan a better prospect than he did with his half.

I wish now to introduce another personal experience for the sake of the morals contained in it, and as bringing out some of the special risks to be guarded against in mine examination. The story is at my own expense, and may, therefore, be somewhat unusual in the *Transactions* of a scientific Institution. I am not afraid of the example being followed to the injury of the reputation for shrewdness of mining engineers generally. It is not pleasant to write oneself down as an ass in any form; and personal experience which, if related, might lead to such conclusions are usually kept as private as circumstances will permit. Some experiences which might be very instructive if published, but which naturally do not get known, are those arising from salting when the expert never knows himself of its occurrence.

A few years ago, an English mining engineer and friend of mine brought to me in New York—where I then had a testing mill and assay office—a series of average samples he had taken from a silver mine in the Rocky Mountains, and also half a ton of the average ore for a milling test. The samples came out very well, the milling test showed no difficulty in treatment, and the engineer's report to his English principals was quite a glowing one. For financial reasons the purchase fell through in London, and a year later the owner of the mine called to see me about the property. I had been so well impressed with my friend's report on the mine, and the owner's description, that I made offers to purchase on behalf of an English company, subject to examination. Before going so far, however, I got a report from a mining engineer resident in the west, and whose name is well known, confirming the owner's statement as to quantity and average grade of ore in sight. In addition to this, I had copies of statements by two other western engineers, showing the mine to be valuable if the ore were worked by milling process instead of by shipment to smelters, as had been done in the past. On this I visited the mine and sampled it carefully, taking some 1200 lbs. of samples, and sealing the sacks in the mine by wire through and round the necks, and held by a special lead seal of my own. I wanted large samples to confirm previous milling tests, as the matter of treatment seemed an important one; but as I could not carry about me, and sleep with 1200 lbs. of ore, and no vigilance would prevent the possibility of value being worked into the sacks if once lost sight of, I took a special precaution against salting in the following manner. The ore occurred as a bedded deposit, and, outside of

occasional pockets of good ore, was reported to be of an average assay value from 30 to 50 ounces of silver per ton by the different engineers who had examined it. It was a question of milling the full width of the bed, which averaged about 6 feet; and the appearance of the ore lent itself wonderfully well to the theory of its average value. I, therefore, took in addition to 26 average samples seven special full sack samples from different parts of the mine, each of which consisted only of large lumps of the poorer ore, without any fine admixture. The object was to have samples which could be readily cleaned when once in my own office, and, therefore, which would be unaffected by any salt introduced in a fine or liquid state into the sacks after sealing. With certainty that there had been no salting, if these lump samples showed a fair silver contents, there could be no doubt whatever as to the value of the deposit.

In this material world good intentions are by themselves very inadequate. My little programme, framed for my own protection, was in an evil moment slightly changed, and thereby ruined. Owing to pressure of enquiry for a preliminary report I decided to crush five of my seven test samples in a neighbouring sampling works, and so satisfy myself as to the lower grade of ore which would determine the probable value of the mine for me. I took every precaution by cleaning up the crusher and rolls myself, and dusting off the lump samples, and crushing and quartering down to the assay samples, which I took in duplicate. One of the sets of samples I gave a local assayer who was I knew interested, and would not have been of course reliable if unchecked. The second set of samples I kept myself in a valise in my bedroom. Subsequent events showed that these private cheque samples were got at, and that the whole mining camp was honeycombed with a six years' standing conspiracy. I had still in reserve the two other lump samples sealed as taken, and which with the other 26 average samples were sent on to New York to await my return. As bad luck would have it, however, I was stopped by telegram on my return, and had to go further west to examine another mine; and the samples arriving before I did, were crushed and assayed by my assistant in New York without the special precaution necessary for the two lump samples of cleaning before crushing.

During the night preceding the shipment of the samples the gang interested worked into each sack a dose of extremely fine divided precipitated silver, which can be purchased in the West from leaching works using copper plate precipitation. In the final crushing and mixing for assay samples the "salt" became properly incorporated, and appeared duly in the results. Investigation later showed that the lump samples alone contained naturally about 2 to 3 ounces of silver per ton, but when properly doctored they went from 20 to 30 ounces. As I cleaned and crushed my first five lump samples, no silver previously worked into the sack could have materially increased the assay of the big pieces, but when once crushed the salting could be easily effected, and, as before mentioned, my small crushed samples were got at afterwards independently. The two lump samples were doubtless given an extra dose before shipment to allow for loss, and my assistant in crushing them doubtless emptied the whole sacks into the crusher, perhaps even shaking them afterwards. There is not the least possible doubt as to the method of salting, because I found afterwards in every sample, by panning and the use of a microscope, that the value lay in the fine metallic silver which did not exist in the mine itself at all.

The presence of the metallic silver in the samples was discovered by me in course of milling tests, and its peculiar character so far raised suspicions as to lead me to endeavour to get a new sampling; but I was defeated by a concatenation of circumstances too involved for explanation here; and chiefly due to the skilful manipulation of the gang, who, with every appearance of willingness to help in any way, managed to block every step. In this course they were assisted by my principals, who pushed on for completion of purchase, and would not hear of any chance of error in view of previous reports by other engineers, and of the necessity of making payments at a fixed date. Nevertheless, within a few days of the completion of the purchase I sampled the mine again; the first assays settled the matter, and I cabled the fact of the whole business being a swindle to the purchasers, and started on the uphill work of bringing the matter home to the gang. Now salting is not a thing which a man does by the roadside while his neighbours are going to church; and unless one of the conspirators should "peach," it is always very difficult to make an absolute case for trial. Owing, however, to the form of "salt" introduced into my sacks, which I was able to separate and exhibit by microscope slides, and to a vast amount of circumstantial and detective evidence collected little by little, I was able, after four years of working and fighting, to get a sweeping judgment against the vendors of the mine. Of the three "honorable gentlemen" who were principally interested in the swindle, one was Mayor of a flourishing town, who has, since the judgment, disappeared from view. Another, who did the scientific part of the work, is I believe enjoying a position of political trust in his country; for in a free and progressive country, under Irish rule, the personal misfortune of being found out and convicted does not spoil a citizen's political career.

From facts and evidence in this case I am able to throw some light, not only on my own shortcomings, but on the misfortunes of three other engineers in respect to this same property, all useful here for the purpose of showing variations in the art of salting. The English engineer had not even sealed his samples, but had tied his sacks with string, and had crushed and sampled the ore in a local mill before shipping to me. Before this, however, the gang had been able to calmly empty out his average samples and fill his sacks with the best selected ore of the mine, so that no introduction of foreign matter was necessary. In my milling tests on his samples I had made no microscopic examination as I did later on my own sampling; and when I found the metallic silver (which I supposed to be native silver, but was still suspicious of) I at once looked for the previous assay samples of a year before. Had I been able then to find these the game would have been up; but here, as at one or two other turning points in the case, it is clear that the devil had a retaining fee from the other side, and was earning it. We usually kept small assay samples of all tests for a year, and then threw them away, and the last cleaning out had been down to and inclusive of the identical samples I wanted. Curiously enough, some months afterwards a single sealed bottle of the mixed average of all the samples of the English engineer was found, and made useful evidence in the case, for it contained none of the metallic silver which constituted the value of my samples.

An American mining man who took small samples and sealed them with the end of his pen-knife, as a distinguishing mark, took the samples himself to the Express Company's office at the nearest railway station, but the agent of the Express Company had been persuaded to let the owners of the mine take a look at these sacks of ore in his charge. They opened the sacks, changed the ore, and resealed the packages, using a pen-knife, as the expert had done.

The experienced Western engineer—whose report had been received by me before I first went to the mine—had taken his samples carefully, quartered them down in the mine to

small samples, put them in sacks, and sealed them with his own seal, having his initial on it. He also delivered his samples personally to the Express Company, and felt safe in consequence. At midnight, two of the salting gang and the Express Company's agent were at work on these sacks. To avoid breaking the seals, which they could not duplicate, they opened the sacks from the bottom, at the join, and neatly sewed them up again after substituting a more satisfactory grade of ore than mere average samples of the mine were likely to prove. A sack which has the sewing of the join inside, and is sealed at the mouth, cannot be opened at the bottom and re-sewed with absolute impunity; but the opening need not be large, and with neat work, and the big chances of the expert having absolute confidence in the Express Company or post office, after he has personally delivered his samples, the business can be done. It certainly succeeded in this instance up to the salter's full expectations. The enterprising gentleman who was directing operations, evidently thought, however, that cutting seams of sacks and re-sewing was more fatiguing and not so artistic as duplicating seals, because he had the foresight to take a copy of the impression of the seal on the sacks, and get one made for himself. The expert's initial was not his, but he explained to his friends that it might come in useful some day.

Besides these three experts and myself, there had previously been a professor of geology who had made a good report, on which a company had been formed, the mine purchased, and some working capital raised. It took this company some time to find out what sort of a property had been secured, because the head of the gang had bargained to be retained as manager. He judiciously steered the business into debt, after getting all the cash forthcoming for working, then sold the whole property cut for a song to one of his confederates, and started out on the search for fresh "suckers." I don't know where the professor was had, but probably he was occupied in the more important geological questions in connection with the deposit, and asked the vendors to get him some good, fair, average samples by which to determine the value.

The microscope or a very strong glass is often of great service, as shown in the foregoing case. In silver ores the silver bearing minerals can often be washed out and identified; and with gold ores the colour and form of the metallic particles are sometimes suggestive. Once in Dakota I was taken to see a vein said to be rich in silver, but the appearance of the vein matter raised an immediate doubt as to what form the silver could be concealed in. By panning I obtained some native silver; but when examined under a glass some of the pieces showed traces of native copper attached. The only place I know where native silver and copper occur actually welded together is the copper region of Lake Superior; and on questioning a little the honest miner who was my guide—and who had kindly assisted in crushing some samples—I found he had formerly worked on Lake Superior. No great intellectual effort was then necessary to account for the occurrence of the silver in the very unpromising looking vein matter.

In the case of panning tests on gold ore, or gravel, or for precious stones, it is of course comparatively easy for anyone who is allowed to be within a short distance of the expert, to get in his salting work, and solitude is the only protection. Among the known methods worth a passing mention are the following: The salter may use a quill toothpick as a weapon for long range shooting, or have gold dust in his nails for short range; or charge his pipe or cigar and not watch where his ashes fall. Cases have been known of gold pans prepared in advance by a valuable varnish which gradually rubbed off in use. Probably some of our members can describe other varieties of means for reaching the same end; and although it is not possible to mention all the devices there may be some utility in putting on record for others the better known ones; for it is certain that many young engineers start out with confidence of much learning, ready to undertake responsible examinations, and without any clear idea of the dangers they are courting. A man may acquire a fair amount of practical experience, and confidence begotten of the same, without happening to get into surroundings of any real danger, and so when least expecting it may yet be nipped. All men of experience agree that the only absolute protection is solitude; and that trusting to knowledge of the old tricks or to personal watchfulness is quite insufficient if any person is immediately around.

#### THE DISCUSSION.

The CHAIRMAN was assured that the meeting would concur in holding that Mr. McDermott had owned up nobly—(laughter)—in his useful and amusing paper. He hoped that others also would make a clean breast of it.

Mr. SEYMOUR, having complimented the author upon his admirable paper, expressed his agreement with the view conveyed in one of the opening sentences that the proper examination of and reporting on mines could never be covered by a set of rules. Mr. McDermott appeared to have been in a severe upon that good old friend of the miner, "the true fissure vein," and, as a matter of fact, he believed that when a true fissure vein—which he understood to be a vein pursuing its course continuously through a variety of strata, or possibly through one stratum—was found, it afforded a very good proof of the continuity of the deposit. Again, as to the question of the increase in depth he was rather disposed to hold with former ideas. His own belief, founded on personal experience, was that good mines did gain in width and depth. There were naturally a number of instances in which this was not the case, but as a general rule a dispassionate view of the richer metalliferous mining districts of the world would lead to the belief that there was tendency to increase in depth. One of the weightiest and most pregnant paragraphs in the paper was that in which the author said:—"The facts of experience show that when a vein is rich at the surface a hope that it may continue is a more proper attitude than a belief that it will set richer in depth; and when it is poor on surface, any change in sinking would be for the better." The remarks in the paper in reference to the estimation of ore in sight, and the subsequent knocking off of a percentage were perfectly correct, but he thought they might be taken as applying more closely to some mines than others. For instance, in the tin or copper, lead or zinc mines, and others of the same category, the mining engineer expected, after careful examination of the mine or district, to find a certain standard percentage through the whole district, in which case there was no necessity as a rule to knock off anything. The reduction was made more in iron or manganese mines, and where the ground was more likely to contain impurities. Passing over a good many paragraphs he might say that he recognised the wisdom of the well-known northern mining man who said he did not want to have anything to do with a mine that would not stand bad management. Coming to the peculiar form of iniquity known as mine salting—a most difficult and yet important matter to deal with—he thought the author had laid scarcely sufficient stress on the great advantage which the salter had over the saltee. (Hear, hear, and applause.) The former had, perhaps, years, certainly months, in which to prepare the mine, whereas the unfortunate engineer, who was hurried off by the promoter, hardly had an opportunity for making a proper examination. In conclusion he would again thank Mr. McDermott for his able and entertaining paper, and congratulate him upon the success with which he had presented a most delicate subject, the difficulties of which, he was sure they would all agree, could only be overcome by experience, intelligence, and, above all, by real honesty of purpose. (Applause.)

Mr. MOREING differed from the last speaker in being able to find no fault whatever with Mr. McDermott's paper, which seemed to be

full of humour, sound common-sense, and very practical wisdom. Of course, to the older hands amongst them there was nothing very new in what the author had said. He could testify, however, that the record of his experiences in connection with the many traps laid for the mining engineer would be of the very greatest use to young members of the profession. (Hear, hear.) Many of the younger engineers, fresh from the School of Mines, had no idea of what they were likely to meet with in the course of their reporting on the mines of distant countries, while the responsibilities they undertook were simply enormous. Many of them might consequently be swindled by some unprincipled seller of mines, and so be ruined for life. (Hear, hear.) The paper would also be an admirable one to place in the hands of the ordinary mining director. (Hear, hear.) The faith which the ordinary promoter's director placed in the reports of what were stated to be celebrated mining engineers, but who had never been heard of before except by the promoter himself, was almost incredible. There were a number of directors, moreover, who had a little dangerous knowledge, who considered themselves quite competent to judge of a mine from its report, and who, for the most part, had no idea of the meaning of the terms, "fissure vein," "increasing in depth," but who induced the investment of an enormous amount of money in what were well known to be rank swindles. This had brought a very bad name upon the mining industry. (Hear, hear.) Until very recently anybody connected with mining was generally regarded as being quite beyond the pale. (Laughter.) Of course, as they all knew, legitimate mining was the most profitable industry in the world. They all knew of the very small working capitals often put into mines, which had to earn dividends on an enormous mass of paper. Very often £5000 had to earn dividends on £500,000. In what other industry could this be done? Reference had been made to Western Australia. Those connected with that colony knew that they had there what would probably turn out to be one of the greatest and richest fields in the world, but certainly many of the companies floated to work mines situated there were palpably the rankest of swindles. (Applause.) As to the lengths of the mining reports, the question was one upon which there was often a good deal of trouble between the promoter and the mining engineer, the former preferring to have some 60 pages of description of the geological features of the district. For himself, however, he considered a short report, written after careful examination and enquiry, saying that the mine was worthless, or the reverse, was quite as fully worth the money. (Hear, hear.) The author had not touched upon the "salting down" of a mine, which had been carried out somewhat extensively, in order to freez out the shareholders, and get all the shares into the hands of the manager and his confederates. The speaker then proceeded to narrate, in some detail, several unsuccessful attempts to impose upon him with both kinds of salting, culminating in one instance in the institution of legal proceedings against himself for having reported unfavourably upon a mine—proceedings, however, which were subsequently withdrawn, while the "mine" itself had, as yet, never been heard of in the industrial world. Salting the engineer was another practice Mr. McDermott had ignored. (Laughter.) The operation had once been attempted upon himself, in order to win his approval of a granite mountain with a few holes in it. This sort of thing had, in fact, been tried with more than one member of the Institution, and he hoped that none of them was likely to succumb to this very glaring method of salting. His own experience as to richness in depth was quite opposed to that of Mr. Seymour.

Mr. SEYMOUR: You have been in the wrong localities. (Laughter.)

Mr. MOREING, proceeding, said he was sure it was a fallacy to suppose that veins got richer in depth. They might, perhaps, increase in richness up to a certain depth, and then again get poorer, but as a rule they decreased in value. In conclusion, he might express his cordial agreement in the plea for the allowance of greater amount of time to the engineer for the preparation of his report. Even men of the greatest experience were liable to serious error if required to report in haste. (Applause.)

Mr. COLLINS thought the difference between Mr. Seymour and Mr. Moreing as to veins in depth was susceptible of an easy reconciliation. He agreed with Mr. Moreing that in regard to fissure veins there was no evidence of any general increase in richness or width in going down; but in taking any twenty mines—ten deep and ten shallow—in a well worked district it would probably be found that the ten deep mines would average wider and richer than the shallow ones, for the latter had not been found rich enough to go down upon. If a mine were followed in depth, the chances were that the vein was far beyond the average. As to the richness at a junction this often depended upon the acuteness of the angle at which they joined—if near a right angle they would probably not exert much influence upon each other. The author's reference to the extent of excavations in the Montana Mine might easily find a parallel in the West of England. Devon Great Consols, for instance, had some 50 miles of drivage, and Dolcoath something more than that. He heartily agreed with the author's remarks as to the proximity of rich mines being no assurance of the value of a property. Numberless object lessons as to this could be found in all parts of the world. One that occurred to him was at Camborne, where the mine adjoining Dolcoath was Cook's Kitchen. Dolcoath had been a dividend-paying mine for a long series of years, and Cook's Kitchen a calling mine also for a long series of years. One difficulty in the estimation of the value of a mining engineer's report was one for which he was not at all responsible. He referred to the fluctuation in the values of the metals, and the consequent uncertainty as to whether the mines would pay to work. Silver and copper were cases in point. With regard to the confessions they had heard that evening, probably most of them who had had any extensive practice had been done more than once—(hear, hear)—and if any member of the Institution had not been cheated he was probably a very young gentleman who had not done very much work. Perhaps, however, they were not exactly called upon to make confession as Mr. McDermott had done. The most experienced Cornish mine captain ever known to the speaker was the father of the present captain of Dolcoath, Captain Charles Thomas, and he had been greatly impressed with the difficulty of forming an accurate opinion as to the value of a mine. His favourite saying as to the ore was, "Where it is, there it is." Another pithy Cornish saying was, "No miner can see beyond the point of his pick." In the case, therefore, of a mine that had not been largely opened by drives, levels, and sinking a great deal of what was said about it must of necessity be guess work. (Applause.)

Mr. PERCIVAL FOWLER thought Mr. McDermott's paper would be one of great value to the public and to the profession. He had hoped that the author would have given a greater number of instances of the different methods of salting. For instance, there was salting with dynamite, gold dust being pressed into the dynamite cartridges.

Mr. CLAUDE VAUTIN had listened to the author's paper with the greatest possible pleasure. The speaker directed his remaining remarks to a humorous description of several attempts at salting which had come to his knowledge, or were within his experience.

Mr. JOSEPH GARLAND thought the paper one which would awaken the greatest interest amongst members of the Institution. Some of the author's criticisms and strictures, however, on mining engineers might, perhaps, be rather disconcerting to the more sensitive among them. Remembering the large number of mining reports he must have written, he felt rather appalled at the amount and variety of the badness they must of necessity have contained. (Laughter.) Candle grease was not an insurmountable difficulty to a learned professor in visiting a mine, who could always obtain the services of a workman or fall back upon gloves. (Laughter.) Perhaps the author had dealt rather hardly with some of the sins of the mining engineer, who would in certain cases be at great loss if he were not allowed to fall back upon a geological description of the formation. He agreed, however, that the Nebular Hypothesis should be sparingly introduced into a mining report. (Laughter.) As to Mr. McDermott's references to true fissure veins it was quite true that most valuable ore deposits were not found in fissure veins at all, but this did not alter the fact

that they were of more frequent occurrence than deposits—using the word in its proper sense—and that they were better known to the average mining man. In regard to the continuance in depth, he thought most of them would be inclined to hold that there were more samples of rich veins becoming poorer than the reverse. Despite this, however, an increase in depth occurred sufficiently often to justify a mining engineer in expressing himself sometimes in very hopeful terms that in the case he was reporting on it might happen. Probably they had all known cases of enrichment at junctions, and it seemed to him that when two productive veins converged to form a junction it was pretty safe to predict that an increase of riches would occur at that point. (Applause.)

Mr. COX reminded the audience that notwithstanding the prevalence of salting there were large numbers of mines which the engineers might visit without any danger of receiving unfair treatment. (Hear, hear.) Numerous instances of salting had come to his knowledge, and in one case he remembered that a mine had been reported on favourably when there had never been a trace of gold in the place. The paper would probably lead most of them to observe a greater caution in the future, and he should certainly bear in mind the various points Mr. McDermott had mentioned. (Hear, hear.)

Mr. HARMAN cited a case where a single good specimen of gold had been made to do duty repeatedly as samples of a mine, and said that mining engineers were frequently sent long journeys to examine what did not exist at all, he, himself, having been sent a long way to inspect a mine that existed only in the imagination.

Mr. FAUVEL spoke of the enormous responsibility resting upon the shoulders of a mining engineer, and described several additional methods of mine salting, such as drilling holes in the rock, and filling them up with gold. The paper would certainly have the effect of sharpening them up, and making them more careful in the future. (Applause.)

Colonel HARRIS mentioned one or two other ways of salting, including that of syringing in the interstices of the forepart of the lode. The paper read might usefully be in the hands of every investor, director, and engineer. He could not help wondering where all the mines of Western Australia were going to get the engineers, who were certainly not born in a day. (Hear, hear.)

Mr. A. G. CHARLETON offered a number of suggestions to the consideration of the meeting with the view of decreasing the possibilities of successful salting. Principal among these were the allowing of plenty of time to make a thorough examination and a ascertain of the local conditions of the field; the comparison of the ore broken and removed to the underground excavations; the noting of the size of the vein at different points along the various levels, &c., from which samples were taken; care in measurement to see that the tapes were not stretched by the employees of the vendors; the employment of outsiders as assistants; the exclusion of the vendors and all connected with them at the time of taking the samples; the division of the samples into two bags, one to remain in the personal custody of the engineer himself; the selection of check samples from different points of the mine. A book would, he thought, be conferred on the industry if one of the leading mining firms were to turn their attention to the manufacture of sample bags made of canvas and properly secured. Beyond these precautions he would, in conclusion, suggest that one or two provisions should be inserted in the purchase agreement to the effect: (a) that the ore in the samples on which the mine was purchased in the belief of the vendors fairly represented the true character and value of the lode at the various points from which they were obtained; (b) that the extent of the mine working was correctly and completely shown on a survey accompanying the deed of sale; and (c) that in the event of any of the statement covered by the foregoing clauses turning out to be false, the purchase should be cancelled. (Applause.)

The AUTHOR, in his reply to the criticisms which his paper had evoked, expressed his gratification at the pleasing reception he had received. He had himself been rather alarmed on finding that he had treated the subject in somewhat of a light manner, but it was rather a difficult matter to treat of without appearing to lay down the law to men who in many respects would be qualified to do the same by him. As to veins in depth, he was still disposed to believe that the experience of most men would lead to the conclusion that there was a tendency to decrease rather than to increase in depth, and that it was very unsafe to trust to depth for any larger figures. An impression appeared to have prevailed in some quarters that he was rather hard upon the mining engineers. His references, however, were, of course, only to the bad ones among them. His thanks were due to Mr. Moreing for calling his attention to the fact that there was a salting down as well as a salting up of mines. Several instances of the kind had occurred within his experience. As to the salting of mining engineers that was a matter for the clergyman to deal with rather than for him. (Laughter.) Mr. Cox was absolutely correct in supposing that there were many mines where there was no possibility of salting, and it was also the fact that in some cases the nature of the ore presented such possibility. In conclusion, the author again pointed out that his remarks had reference only to the unreliable or reckless statements made by so-called "experts," and were not intended to be applied to respectable members of the Institution.

A vote of thanks to the author terminated the proceedings.

#### MINING NOTES FROM JOHANNESBURG.

By H. BUSH, M.E.

##### Metropolitan Mine.

Owing to the improvement in the sorting of the reef, the output per ton has improved over 1 dwt., and a further improvement of 1 dwt. during the next six months can be expected. The lower levels show an improvement in the assays, and the mine under the present management can be expected to have a profit of about £1500 a month from the battery.

##### Knight's (Witwatersrand).

At the water level the ore has been found to assay fully 15 dwts. better than the free milling ore. This is one of the exceptions on the Rand, and it will be interesting to know whether this improvement will last, which at present it has every appearance of doing. It is just possible that the capital will be increased to pay off the debt, which will be fully £75,000 by the time the battery starts about next September.

##### George Goch Mine.

Owing to the reefs being large, which is one great factor in making a big mine, it is the intention of the management to erect extra stamps; and with the increased yield to the ton, this mine will show a great improvement in the future; but the debt is so very heavy that it will be a long time before dividends are paid.

##### Comet Mine.

The results in the past show that a profit of fully 16s. per ton will be obtained, and as the reefs are of a decent size, a large mill will be easily kept going, at the same time, there are patches in this district that will only give a very small profit.

##### Ginsberg Mine.

The assays from the Western block have lately proved disappointing, and there is no doubt that for the future the East block will be the future mine. There will be an amalgamation with the adjoining mines, but the immediate future is not bright.

##### Luipaard's Vlei Estate.

The pannings from this estate have been, so far, disappointing, and it is doubtful if ever a profit more than a few shillings per ton will be obtained.

the water drained 90 fathoms under the surface. At the present price of lead this would be a first-rate speculation of itself.

Secondly, the Redmoor Company, working on the Tin lode that is about 40 fathoms from your boundary at surface, it is underlying north over 3 feet in a fathom. At this point you have 87 fathoms of backs dry, so this lode should be in your sett at the bottom level that is now dry, and cut in every level under by prosecuting the Lead lode.

Thirdly, the Kelly Bray Copper lode has not been seen west of the great crosscourse since the commencement of the present company. This lode is also cut at every level by prosecuting the Lead lode. All the cost to get in any of these levels would be dropping down a few ladders. Taking these things into consideration, in addition to your present workings, I have reason to believe that with a small outlay it will make one of the best paying mines in the neighbourhood.

Callington, 1871.

JOHN BUCKINGHAM,

(Vol. XLI, p. 151.)

(To be continued.)

## MINING REPORTS AND MINE SALTING.

By WALTER McDERMOTT.

(Continued from page 1407.)

### MINE SALTING.

THERE are all degrees of "fixing a mine": from the legitimate showing of its best features by not taking out all the rich ore before offering for sale, or by varying degrees of skulduggery up to palpable salting of mines, dumps, and expert's samples. In the less illegitimate stages much can be done, and very frequently is done, in the way of a judicious stopping of faces in good ore, and by the observing of a discreet silence as to past weaknesses and irregularities of the ore deposits. In such cases it is simply the ordinary commercial position of "let the buyer beware," and the expert has to show by his report if he has experience, observation, and sense enough to form a sound judgment as to value.

In a mine which is thus carefully prepared for selling, it is not at all uncommon for the owner to go beyond the legitimate limit already indicated, and to misrepresent facts by filling up or concealing old workings which would, if examined, produce an unfavourable impression. The next step in the downward path which leads to a hotter place (but in the meantime also sometimes to affluence) is the scooping out of the inside of apparently solid blocks of good ground by openings afterwards filled up or timbered over. Some of the most experienced mining men and engineers have fallen victims to this and the previously described course of conduct; while some have just escaped being caught by a mere accidental indication of the fraud, or by "peaching" of some miner who helped in the work and had not been squared. Naturally the danger from the sources mentioned is much less in new mines of limited extent than in old mines extensively developed. In a mine which has been worked for some time the visiting engineer is at a great disadvantage as compared with the men who have worked in it for years, and perhaps devoted their greatest skill to making not only a good record, but to concealing the exhaustion which is approaching. It happens occasionally also that the owners complete their work, by "picking the eyes out of the mine," in the interval between the expert's report and the turning over of the property to the purchasers. The richer the nature of the pay ore in the mine, the greater the danger from this piece of rascality, which needs specially providing against in the terms of purchase, and by other precautions.

The above-mentioned very real and not uncommon dangers, against which the engineer has to guard, are not, however, "Salting" in its proper and technical sense, which is generally understood as covering any interference with the expert's chance of arriving at a true estimate of the value of ore. The salting may be done on the ore before the expert's arrival, or during his sampling, or on his samples when taken, or while panning or assaying.

Although cases are well known of faces in a mine being salted wth such success as to catch the unwary, this form of salting is usually too difficult to carry out, and too superficial in character to offer much chance of catching an old bird. With ore dumps and alluvial deposits it can be done with better chances of success but is naturally of an expensive nature if carried out on a really systematic plan. Cases are on record of successful salting of alluvial ground with precious stones as well as with gold, and the expert must clearly be on the watch against this, where circumstances allow of the possibility of its occurrence. With ore dumps it is often very easy to arrange a veneering of good ore over a very large pile of poor or barren rock, and then when the ingenious gentleman who takes samples "at random" comes along he will be sure to obtain a gratifying result.

A good many years ago I made the personal acquaintance of a prepared property on Lake Superior. It was a home made tin mine. There had been rumours of valuable discoveries of tin ore on the north shore, where I was then living; and late one autumn an expedition from the United States went to report on it, taking an experienced Cornish mining captain for the necessary technical knowledge. A very glowing report was issued, and a company formed; rich samples were exhibited, and some tin run out of them and melted into spoons, which were presented to the fortunate shareholders. At that time the north shore was inaccessible for six months, except by a 200 miles tramp on snow shoes to where I was, or 350 miles to the tin property, so the excitement grew during the winter, from the enchantment which distance lends. The report and the news of the excitement reached us in course of mail, and I was sent with an expedition and a land surveyor to report on the properties and take up land adjoining before navigation opened, and before anyone else could reach the spot, which needed only 150 miles of snow shoeing for us. A good deal of ingenuity and work had been expended in making a tin vein, and a township had been surveyed in anticipation of the future rush for land. Some natural cracks in the country rock true fissure veins which Nature had overlooked when the mineral solutions were ladled out, had been filled up with a mixture of broken tin ore from Cornwall, copper tailings from Lake Superior, and soluble silicates for cementing material. In the camp of the promoters we found a barrel of the soluble silicates used. In the meantime, the idea of the value of the discovery had grown so much that it seemed necessary to sell the property in London; the United States could not hold it, and a financier—who was really a believer—was sent across the water. Curiously enough he applied to people for whom I had previously made reports, and on my return to head-quarters, with the principal vein in my possession, I found a cable asking me to report how many millions it was worth, which I was able quickly and accurately to determine. Some years later in Colorado I was introduced to the gentleman who planted the deposit with the explanation that I was the individual who had taken away his best lode in a small boat. The circumstantial

report by the Cornish mining captain I have since heard explained by the fact that he was not accustomed to the particular brand of champagne used on the expedition.

My first report on a silver property in the same country was not calculated to breed confidence in mining methods. I had left England with a full report by a Government surveyor of the mine and its riches, but the claim was covered by the virgin forest: not a sign of outcrop or working; nothing to sample. There was nothing to report on but a magnificent crop of black flies and mosquitoes. The sanguine Government surveyor had evolved his description out of his inner consciousness, and aided by a 10 feet shaft on a small vein on an adjoining property. Since that time I have never felt a blind confidence in Government surveyors as mining experts.

The salting of samples is, however, much more common than any other form of getting ahead of the expert. It is less expensive than salting in advance, more deadly, and can be nicely adjusted to circumstances and to the individual weakness of the victim. When the owner of the mine, or anyone connected with him, is allowed to assist in the sampling itself, there is no lack of opportunity with some ores for the artful salting while in the mine; but as a rule engineers do not have the requisite faith in human nature to accept such assistance, unless the character of the ore and kind of samples required make salting impossible at the time. In a strange district where assistance of some sort has to be obtained in breaking and transporting large samples, and the character of such assistance is not absolutely certain, the engineer must guard himself by duplicating entirely alone certain test samples. Assuming that samples have been secured without any chance of outside interference, the business is by no means ended, for the enterprising salter will follow those samples until actually panned or assayed, or taken out of his reach. I propose to illustrate some of these special dangers by the aid of a few personal experiences which will show that neither keeping samples locked up or sealed, or delivered to post office or Express Company, will insure absolute protection in all circumstances. In fact, to paraphrase a patriotic maxim, it may be said that "eternal vigilance is the price of freedom from salting."

To the successful cultivation of the art of salting no great knowledge or experience of mining is necessary, any more than a study of architecture is essential to the practice of burglary. True ability will assert itself in this as in other employments by the invention of new means to meet special cases, and by a proper discretion in regulating the dose of salt administered to the temperament of the patient. Sometimes the honest miner will freely relate stories of methods by which experts had been salted, implying delicately that no such schemes would be successful with his hearer, but reserving one, undescribed, for purposes of personal illustration later. As an example of the unexpected which may occur after samples have been safely removed from the mine, I may refer to a case in the Rocky Mountains, where I had taken some samples to the nearest town and made arrangements with the local assayer for the use of his office. I preferred to make my own assays, not from any chance of his knowing where the samples were from, but rather from a distrust of his somewhat rule-of-thumb methods. I allowed his brother professional to continue his work while I did mine; and, although apparently quite satisfied that I should pay him for the assays and do the work myself, his feelings must have been injured, for he doctored my samples without any other possible motive.

This inhospitable action caused me some annoyance and extra travel, but otherwise fortunately had no serious results beyond what lessening in me the proper Christian belief in one's fellows.

It is remarkable how generally the elementary knowledge of salting is distributed over the earth. Wherever mining is, there the salter is likely to be developed, regardless of differences in climate, language or religion. The art is not unknown in England. Not long ago I was asked to look at a gold placer in Wales, and though I should not have picked the country myself for exploring purposes, the terms offered left all the risk on the other side—so I went. The owner took me over the ground, and I industriously panned in all the likely spots pointed out with never a colour to cheer my heart. The owner delicately intimated that perhaps I was not much of a hand at panning, and, further, that my gold pan was a poor contrivance. He thereupon sent up into the mountains for a certain Welsh mining captain, who duly came down with a Mexican wooden batea, and promptly produced good prospects from various places. He was so very skilful that when I gave him a sample of my own tailings from tests before he arrived, without mentioning their source, he got a fine healthy show of gold even from them. When I mentioned that he had been working on what I washed off without getting a colour, the Welshman was so confident of the fault being on my side, that I took half of the next sample he was about to wash and showed in my pan a better prospect than he did with his half.

I wish now to introduce another personal experience for the sake of the morals contained in it, and as bringing out some of the special risks to be guarded against in mine examination. The story is at my own expense, and may, therefore, be somewhat unusual in the *Transactions* of a scientific Institution. I am not afraid of the example being followed to the injury of the reputation for shrewdness of mining engineers generally. It is not pleasant to write oneself down as an ass in any form; and personal experience which, if related, might lead to such conclusions are usually kept as private as circumstances will permit. Some experiences which might be very instructive if published, but which naturally do not get known, are those arising from salting when the expert never knows himself of its occurrence.

A few years ago, an English mining engineer and friend of mine brought to me in New York—where I then had a testing mill and assay office—a series of average samples he had taken from a silver mine in the Rocky Mountains, and also half a ton of the average ore for a milling test. The samples came out very well, the milling test showed no difficulty in treatment, and the engineer's report to his English principals was quite a glowing one. For financial reasons the purchase fell through in London, and a year later the owner of the mine called to see me about the property. I had been so well impressed with my friend's report on the mine, and the owner's description, that I made offers to purchase on behalf of an English company, subject to examination. Before going so far, however, I got a report from a mining engineer resident in the west, and whose name is well known, confirming the owner's statement as to quantity and average grade of ore in sight. In addition to this, I had copies of statements by two other western engineers, showing the mine to be valuable if the ore were worked by milling process instead of by shipment to smelters, as had been done in the past. On this I visited the mine and sampled it carefully, taking some 1200 lbs. of samples, and sealing the sacks in the mine by wire through and round the necks, and held by a special lead seal of my own. I wanted large samples to confirm important milling tests, as the matter of treatment seemed an important one; but as I could not carry about me, and sleep with 1200 lbs. of ore, and no vigilance would prevent the possibility of value being worked into the sacks if once lost sight of, I took a special precaution against salting in the following manner. The ore occurred as a bedded deposit, and, outside of

occasional pockets of good ore, was reported to be of an average assay value from 30 to 50 ounces of silver per ton by the different engineers who had examined it. It was a question of milling the full width of the bed, which averaged about 8 feet; and the appearance of the ore lent itself wonderfully well to the theory of its average value. I, therefore, took in addition to 26 average samples seven special full sack samples from different parts of the mine, each of which consisted only of large lumps of the poorer ore, without any fine admixture. The object was to have samples which could be readily cleaned when once in my own office, and, therefore, which would be unaffected by any salt introduced in a fine or liquid state into the sacks after sealing. With certainty that there had been no salting, if these lump samples showed a fair silver contents, there could be no doubt whatever as to the value of the deposit.

In this material world good intentions are by themselves very inadequate. My little programme, framed for my own protection, was in an evil moment slightly changed, and thereby ruined. Owing to pressure of enquiry for a preliminary report I decided to crush five of my seven test samples in a neighbouring sampling works, and so satisfy myself as to the lower grade of ore which would determine the probable value of the mine for me. I took every precaution by cleaning up the crusher and rolls myself, and dusting off the lump samples, and crushing and quartering down to the assay samples, which I took in duplicate. One of the sets of samples I gave a local assayer who was I knew interested, and would not have been of course reliable if unchecked. The second set of samples I kept myself in a valise in my bedroom. Subsequent events showed that these private cheque samples were got at, and that the whole mining camp was honeycombed with a six years' standing conspiracy. I had still in reserve the two other lump samples sealed as taken, and which with the other 26 average samples were sent on to New York to await my return. As bad luck would have it, however, I was stopped by telegram on my return, and had to go further west to examine another mine; and the samples arriving before I did, were crushed and assayed by my assistant in New York without the special precaution necessary for the two lump samples of cleaning before crushing.

During the night preceding the shipment of the samples the gang interested worked into each sack a dose of extremely fine divided precipitated silver, which can be purchased in the West from leaching works using copper plate precipitation. In the final crushing and mixing for assay samples the "salt" became properly incorporated, and appeared duly in the results. Investigation later showed that the lump samples alone contained naturally about 2 to 3 ounces of silver per ton, but when properly doctored they went from 20 to 30 ounces. As I cleaned and crushed my first five lump samples, no silver previously worked into the sack could have materially increased the assay of the big pieces, but when once crushed the salting could be easily effected, and, as before mentioned, my small crushed samples were got at afterwards independently. The two lump samples were doubtless given an extra dose before shipment to allow for loss, and my assistant in crushing them doubtless emptied the whole sacks into the crusher, perhaps even shaking them afterwards. There is not the least possible doubt as to the method of salting, because I found afterwards in every sample, by panning and the use of a microscope, that the value lay in the fine metallic silver which did not exist in the mine itself at all.

The presence of the metallic silver in the samples was discovered by me in course of milling tests, and its peculiar character so far raised suspicions as to lead me to endeavour to get a new sampling; but I was defeated by a concatenation of circumstances too involved for explanation here; and chiefly due to the skilful manipulation of the gang, who, with every appearance of willingness to help in any way, managed to block every step. In this course they were assisted by my principals, who pushed on for completion of purchase, and would not hear of any chance of error in view of previous reports by other engineers, and of the necessity of making payments at a fixed date. Nevertheless, within a few days of the completion of the purchase I sampled the mine again; the first assays settled the matter, and I cabled the fact of the whole business being a swindle to the purchasers, and started on the uphill work of bringing the matter home to the gang. Now salting is not a thing which a man does by the roadside while his neighbours are going to church; and unless one of the conspirators should "peach," it is always very difficult to make an absolute case for trial. Owing, however, to the form of "salt" introduced into my sacks, which I was able to separate and exhibit by microscope slides, and to a vast amount of circumstantial and detective evidence collected little by little, I was able, after four years of working and fighting, to get a sweeping judgment against the vendors of the mine. Of the three "honourable gentlemen" who were principally interested in the swindle, one was Mayor of a flourishing town, who has, since the judgment, disappeared from view. Another, who did the scientific part of the work, is believed enjoying a position of political trust in his country; for in a free and progressive country, under Irish rule, the personal misfortune of being found out and convicted does not spoil a citizen's political career.

From facts and evidence in this case I am able to throw some light, not only on my own shortcomings, but on the misfortunes of three other engineers in respect to this same property, all useful here for the purpose of showing variations in the art of salting. The English engineer had not even sealed his samples, but had tied his sacks with string, and had crushed and sampled the ore in a local mill before shipping to me. Before this, however, the gang had been able to calmly empty out his average samples and fill his sacks with the best selected ore of the mine, so that no introduction of foreign matter was necessary. In my milling tests on his samples I had made no microscopic examination as I did later on my own sampling; and when I found the metallic silver (which I supposed to be native silver, but was still suspicious of) I at once looked for the previous assay samples of a year before. Had I been able then to find these the game would have been up; but here, as at one or two other turning points in the case, it is clear that the devil had a retaining fee from the other side, and was earning it. We usually kept small assay samples of all tests for a year, and then threw them away, and the last cleaning out had been down to and inclusive of the identical samples I wanted. Curiously enough, some months afterwards a single sealed bottle of the mixed average of all the samples of the English engineer was found, and made useful evidence in the case, for it contained none of the metallic silver which constituted the value of my samples.

An American mining man who took small samples and sealed them with the end of his pen-knife, as a distinguishing mark, took the samples himself to the Express Company's office at the nearest railway station, but the agent of the Express Company had been persuaded to let the owners of the mine take a look at these sacks of ore in his charge. They opened the sacks, changed the ore, and resealed the packages, using a pen-knife, as the expert had done.

The experienced Western engineer—whose report had been received by me before I first went to the mine—had taken his samples carefully, quartered them down in the mine to

small samples, put them in sacks, and sealed them with his own seal, having his initial on it. He also delivered his samples personally to the Express Company, and felt safe in consequence. At midnight, two of the salting gang and the Express Company's agent were at work on these sacks. To avoid breaking the seals, which they could not duplicate, they opened the sacks from the bottom, at the join, and neatly sewed them up again after substituting a more satisfactory grade of ore than mere average samples of the mine were likely to prove. A sack which has the sewing of the join inside, and is sealed at the mouth, cannot be opened at the bottom and re-sewed with absolute impunity; but the opening need not be large, and with neat work, and the big chances of the expert having absolute confidence in the Express Company or post office, after he has personally delivered his samples, the business can be done. It certainly succeeded in this instance up to the salter's full expectations. The enterprising gentleman who was directing operations, evidently thought, however, that cutting seams of sacks and re-sewing was more fatiguing and not so artistic as duplicating seals, because he had the foresight to take a copy of the impression of the seal on the sacks, and get one made for himself. The expert's initial was not his, but he explained to his friends that it might come in useful some day.

Besides these three experts and myself, there had previously been a professor of geology who had made a good report, on which a company had been formed, the mine purchased, and some working capital raised. It took this company some time to find out what sort of a property had been secured, because the head of the gang had bargained to be retained as manager. He judiciously steered the business into debt, after getting all the cash forthcoming for working, then sold the whole property cut for a song to one of his confederates, and started out on the search for fresh "suckers." I don't know how the professor was had, but probably he was occupied in the more important geological questions in connection with the deposit, and asked the vendors to get him some good, fair, average samples by which to determine the value.

The microscope or a very strong glass is often of great service, as shown in the foregoing case. In silver ores the silver bearing minerals can often be washed out and identified; and with gold ores the colour and form of the metallic particles are sometimes suggestive. Once in Dakota I was taken to see a vein said to be rich in silver, but the appearance of the vein matter raised an immediate doubt as to what form the silver could be concealed in. By panning I obtained some native silver; but when examined under a glass some of the pieces showed traces of native copper attached. The only place I know where native silver and copper occur actually welded together is the copper region of Lake Superior; and on questioning a little the honest miner who was my guide—and who had kindly assisted in crushing some samples—I found he had formerly worked on Lake Superior. No great intellectual effort was then necessary to account for the occurrence of the silver in the very unpromising looking vein matter.

In the case of panning tests on gold ore, or gravel, or for precious stones, it is of course comparatively easy for anyone who is allowed to be within a short distance of the expert, to get in his salting work, and solitude is the only protection. Among the known methods worth a passing mention are the following: The salter may use a quill toothpick as a weapon for long range shooting, or have gold dust in his nails for short range; or charge his pipe or cigar and not watch where his ashes fall. Cases have been known of gold pans prepared in advance by a valuable varnish which gradually rubbed off in use. Probably some of our members can describe other varieties of means for reaching the same end; and although it is not possible to mention all the devices there may be some utility in putting on record for others the better known ones; for it is certain that many young engineers start out with confidence of much learning, ready to undertake responsible examinations, and without any clear idea of the dangers they are courting. A man may acquire a fair amount of practical experience, and confidence begotten of the same, without happening to get into surroundings of any real danger, and so when least expecting it may yet be nipped. All men of experience agree that the only absolute protection is solitude; and that trusting to knowledge of the old tricks or to personal watchfulness is quite insufficient if any person is immediately around.

#### THE DISCUSSION.

The CHAIRMAN was assured that the meeting would concur in holding that Mr. McDermott had owned up nobly—(laughter)—in his useful and amusing paper. He hoped that others also would make a clean breast of it.

Mr. SEYMOUR, having complimented the author upon his admirable paper, expressed his agreement with the view conveyed in one of the opening sentences that the proper examination of and reporting on mines could never be covered by a set of rules. Mr. McDermott appeared to have been in her severe upon that good old friend of the miner, "the true fissure vein," and, as a matter of fact, he believed that when a true fissure vein—which he understood to be a vein pursuing its course continuously through a variety of strata, or possibly through one stratum—was found, it afforded a very good proof of the continuity of the deposit. Again, as to the question of the increase in depth he was rather disposed to hold with former ideas. His own belief, founded on personal experience, was that good mines did gain in width and depth. There were naturally a number of instances in which this was not the case, but as a general rule a dispassionate view of the richer metalliferous mining districts of the world would lead to the belief that there was a tendency to increase in depth. One of the weightiest and most pregnant paragraphs in the paper was that in which the author said:—"The facts of experience show that when a vein is rich at the surface a hope that it may continue is a more proper attitude than a belief that it will get richer in depth; and when it is poor on surface, any change in sinking would be for the better." The remarks in the paper in reference to the estimation of ore in sight, and the subsequent knocking off of a percentage were perfectly correct, but he thought they might be taken as applying more closely to some mines than others. For instance, in the tin or copper, lead or zinc mines, and others of the same category, the mining engineer expected, after careful examination of the mine or district, to find certain standard percentage throughout the whole district, in which case there was no necessity as a rule to knock off anything. The reduction was made more in iron or manganese mines, and where the ground was more likely to contain impurities. Passing over a good many paragraphs he might say that he recognised the wisdom of the well-known northern mining man who said he did not want to have anything to do with a mine that would not stand bad management. Coming to the peculiar form of iniquity known as mine salting—a most difficult and yet important matter to deal with—he thought the author had laid scarcely sufficient stress on the great advantage which the salter had over the saltee. (Hear, hear, and applause.) The former had, perhaps, years, certainly months, in which to prepare the mine, whereas the unfortunate engineer, who was hurried off by the promoter, hardly had an opportunity for making a proper examination. In conclusion he would again thank Mr. McDermott for his able and entertaining paper, and congratulate him upon the success with which he had presented a most delicate subject, the difficulties of which, he was sure they would all agree, could only be overcome by experience, intelligence, and, above all, by real honesty of purpose. (Applause.)

Mr. MOREING differed from the last speaker in being able to find no fault whatever with Mr. McDermott's paper, which seemed to be

full of humour, sound common-sense, and very practical wisdom. Of course, to the older hands amongst them there was nothing very new in what the author had said. He could testify, however, that the record of his experiences in connection with the many traps laid for the mining engineer would be of the very greatest use to young members of the profession. (Hear, hear.) Many of the younger engineers, fresh from the School of Mines, had no idea of what they were likely to meet with in the course of their reporting on the mines of distant countries, while the responsibilities they undertook were simply enormous. Many of them might consequently be swindled by some unprincipled seller of mines, and so be ruined for life. (Hear, hear.) The paper would also be an admirable one to place in the hands of the ordinary mining director. (Hear, hear.) The faith which the ordinary promoter's director placed in the reports of what were stated to be celebrated mining engineers, but who had never been heard of before except by the promoter himself, was almost incredible. There were a number of directors, moreover, who had a little dangerous knowledge, who considered themselves quite competent to judge of a mine from its report, and who, for the most part, had no idea of the meaning of the terms, "fissure vein," "increasing in depth," but who induced the investment of an enormous amount of money in what were well known to be rank swindles. This had brought a very bad name upon the mining industry. (Hear, hear.) Until very recently anybody connected with mining was generally regarded as being quite beyond the pale. (Laughter.) Of course, as they all knew, legitimate mining was the most profitable industry in the world. They all knew of the very small working capitals often put into mines, which had to earn dividends on an enormous mass of paper. Very often £5000 had to earn dividends on £500,000. In what other industry could this be done? Reference had been made to Western Australia. Those connected with that colony knew that they had there what would probably turn out to be one of the greatest and richest fields in the world, but certainly many of the companies floated to work mines situated there were palpably the rankest of swindles. (Applause.) As to the lengths of the mining reports, the question was one upon which there was often a good deal of trouble between the promoter and the mining engineer, the former preferring to have some 60 pages of description of the geological features of the district. For himself, however, he considered a short report, written after careful examination and enquiry, saying that the mine was worthless, or the reverse, was quite as fully worth the money. (Hear, hear.) The author had not touched upon the "salting down" of a mine, which had been carried out somewhat extensively, in order to freeze out the shareholders, and get all the shares into the hands of the manager and his confederates. The speaker then proceeded to narrate, in some detail, several unsuccessful attempts to impose upon him with both kinds of salting, culminating in one instance in the institution of legal proceedings against himself for having reported unfavourably upon a mine—proceedings, however, which were subsequently withdrawn, while the "mine" itself had, as yet, never been heard of in the industrial world. Salting the engineer was another practice Mr. McDermott had ignored. (Laughter.) The operation had once been attempted upon himself, in order to win his approval of a granite mountain with a few holes in it. This sort of thing had, in fact, been tried with more than one member of the Institution, and he hoped that none of them was likely to succumb to this very glaring method of salting. His own experience as to richness in depth was quite opposed to that of Mr. Seymour.

Mr. SEYMOUR: You have been in the wrong localities. (Laughter.) Mr. MOREING, proceeding, said he was sure it was a fallacy to suppose that veins got richer in depth. They might, perhaps, increase in richness up to a certain depth, and then again get poorer, but as a rule they decreased in value. In conclusion, he might express his cordial agreement in the plan for the allowance of a greater amount of time to the engineer for the preparation of his report. Even men of the greatest experience were liable to serious error if required to report in haste. (Applause.)

Mr. COLLINS thought the difference between Mr. Seymour and Mr. Moreing as to veins in depth was susceptible of an easy reconciliation. He agreed with Mr. Moreing that in regard to fissure veins there was no evidence of any general increase in richness or width in going down; but in taking any twenty mines—ten deep and ten shallow—in a well-worked district it would probably be found that the ten deep mines would average wider and richer than the shallow ones, for the latter had not been found rich enough to go down upon. If a mine were followed in depth, the chances were that the vein was far beyond the average. As to the richness at a junction this often depended upon the acuteness of the angle at which they joined—if near a right angle they would probably not exert much influence upon each other. The author's reference to the extent of excavations in the Montana Mine might easily find a parallel in the West of England. Devon Great Consols, for instance, had some 50 miles of drivage, and Dolcoath something more than that. He heartily agreed with the author's remarks as to the proximity of rich mines being no assurance of the value of a property. Numerous object lessons as to this could be found in all parts of the world. One that occurred to him was at Camborne, where the mine adjoining Dolcoath was Cook's Kitchen. Dolcoath had been a dividend-paying mine for a long series of years, and Cook's Kitchen a calling mine also for a long series of years. One difficulty in the estimation of the value of a mining engineer's report was one for which he was not at all responsible. He referred to the fluctuation in the values of the metals, and the consequent uncertainty as to whether the mines would pay to work. Silver and copper were cases in point. With regard to the confessions they had heard that evening, probably most of them who had had any extensive practice had been done more than once—(hear, hear)—and if any member of the Institution had not been cheated he was probably a very young gentleman who had not done very much work. Perhaps, however, they were not exactly called upon to make confession as Mr. McDermott had done. The most experienced Cornish mine captain ever known to the speaker was the father of the present captain of Dolcoath, Captain Charles Thomas, and he had been greatly impressed with the difficulty of forming an accurate opinion as to the value of a mine. His favourite saying as to the ore was, "Where it is, there it is." Another pithy Cornish saying was, "No miner can see beyond the point of his pick." In the case, therefore, of a mine that had not been largely opened by drives, levels, and sinking a great deal of what was said about it must of necessity be guess work. (Applause.)

Mr. PERCIVAL FOWLER thought Mr. McDermott's paper would be one of great value to the public and to the profession. He had hoped that the author would have given a greater number of instances of the different methods of salting. For instance, there was salting with dynamite, gold dust being pressed into the dynamite cartridges.

Mr. CLAUDE VAUTIN had listened to the author's paper with the greatest possible pleasure. The speaker directed his remaining remarks to a humorous description of several attempts at salting which had come to his knowledge, or were within his experience.

Mr. JOSEPH GARLAND thought the paper one which would awaken the greatest interest among members of the Institution. Some of the author's criticisms and strictures, however, on mining engineers might, perhaps, be rather disconcerting to the more sensitive among them. Remembering the large number of mining reports he must have written, he felt rather appalled at the amount and variety of the badness they must of necessity have contained. (Laughter.) Candle grease was not an insurmountable difficulty to a learned professor in visiting a mine, who could always obtain the services of a workmen or fall back upon gloves. (Laughter.) Perhaps the author had dealt rather hardily with some of the sins of the mining engineer, who would in certain cases be at great loss if he were not allowed to fall back upon a geological description of the formation. He agreed, however, that the Nebular Hypothesis should be sparingly introduced into a mining report. (Laughter.) As to Mr. McDermott's references to true fissure veins it was quite true that most valuable ore deposits were not found in fissure veins at all, but this did not alter the fact

that they were of more frequent occurrence than deposits—using the word in its proper sense—and that they were better known to the average mining man. In regard to the continuance in depth, he thought most of them would be inclined to hold that there were more samples of rich veins becoming poorer than the reverse. Despite this, however, an increase in depth occurred sufficiently often to justify a mining engineer in expressing himself sometimes in very hopeful terms that in the case he was reporting on it might happen. Probably they had all known cases of enrichment at junctions, and it seemed to him that when two productive veins converged to form a junction it was pretty safe to predict that an increase of riches would occur at that point. (Applause.)

Mr. COX reminded the audience that, notwithstanding the prevalence of salting there were large numbers of mines which the engineers might visit without any danger of receiving unfair treatment. (Hear, hear.) Numerous instances of salting had come to his knowledge, and in one case he remembered that a mine had been reported on favourably when there had never been a trace of gold in the place. The paper would probably lead most of them to observe a greater caution in the future, and he should certainly bear in mind the various points Mr. McDermott had mentioned. (Hear, hear.)

Mr. HARMAN cited a case where a single good specimen of gold had been made to do duty repeatedly as samples of a mine, and said that mining engineers were frequently sent long journeys to examine what did not exist at all, he, himself, having been sent a long way to inspect a mine that existed only in the imagination.

Mr. FAUVEL spoke of the enormous responsibility resting upon the shoulders of a mining engineer, and described several additional methods of mine salting, such as drilling holes in the rock, and filling them up with gold. The paper would certainly have the effect of sharpening them up, and making them more careful in the future. (Applause.)

Colonel HARRIS mentioned one or two other ways of salting, including that of syringing in the interstices of the forebreast of the lode. The paper read might usefully be in the hands of every investor, director, and engineer. He could not help wondering where all the mines of Western Australia were going to get the engineers, who were certainly not born in a day. (Hear, hear.)

Mr. A. G. CHARLETON offered a number of suggestions to the consideration of the meeting with the view of decreasing the possibilities of successful salting. Principal among these were the allowing of plenty of time to make a thorough examination and the attainment of the local conditions of the field; the comparison of the ore broken and removed to the underground excavations; the noting of the size of the vein at different points along the various levels, &c., from which samples were taken; care in measurement to see that the tapes were not stretched by the employees of the vendors; the employment of outsiders as assistants; the exclusion of the vendors and all connected with them at the time of taking the samples; the division of the samples into two bags, one to remain in the personal custody of the engineer himself; the selection of check samples from different points of the mine. A boon would, he thought, be conferred on the industry if one of the leading mining firms were to turn their attention to the manufacture of sample bags made of canvas and properly secured. Beyond these precautions he would, in conclusion, suggest that one or two provisions should be inserted in the purchase agreement to the effect (a) that the ore in the samples on which the mine was purchased in the belief of the vendors fairly represented the true character and value of the lode at the various points from which they were obtained; (b) that the extent of the mine working was correctly and completely shown on a survey accompanying the deed of sale; and (c) that in the event of any of the statement covered by the foregoing clauses turning out to be false, the purchase should be cancelled. (Applause.)

The AUTHOR, in his reply to the criticisms which his paper had evoked, expressed his gratification at the pleasing reception he had received. He had himself been rather alarmed on finding that he had treated the subject in somewhat of a light manner, but it was rather a difficult matter to treat of without appearing to lay down the law to men who in many respects would be qualified to do the same by him. As to veins in depth, he was still disposed to believe that the experience of most men would lead to the conclusion that there was a tendency to decrease rather than to increase in depth, and that it was very unsafe to trust to depth for any larger figures. An impression appeared to have prevailed in some quarters that he was rather hard upon the mining engineers. His references, however, were, of course, only to the bad ones among them. His thanks were due to Mr. Moreing for calling his attention to the fact that there was a salting down as well as salting up of mines. Several instances of the kind had occurred within his experience. As to the salting of mining engineers that was a matter for the clergyman to deal with rather than for him. (Laughter.) Mr. Cox was absolutely correct in supposing that there were many mines where there was no possibility of salting, and it was also the fact that in some cases the nature of the ore presented such possibility. In conclusion, the author again pointed out that his remarks had reference only to the unreliable or feckless statements made by so-called "experts," and were not intended to be applied to respectable members of the Institution. A vote of thanks to the author terminated the proceedings.

#### MINING NOTES FROM JOHANNESBURG.

By H. BUSH, M.E.

##### Metropolitan Mine.

Owing to the improvement in the sorting of the reef, the output per ton has improved over 1 dwt., and a further improvement of 1 dwt. during the next six months can be expected. The lower levels show an improvement in the assays, and the mine under the present management can be expected to have a profit of about £1500 a month from the battery.

##### Knight's (Witwatersrand).

At the water level the ore has been found to assay fully 15 dwts. better than the free milling ore. This is one of the exceptions on the Rand, and it will be interesting to know whether this improvement will last, which at present it has every appearance of doing. It is just possible that the capital will be increased to pay off the debt, which will be fully £75,000 by the time the battery starts about next September.

##### George Goch Mine.

Owing to the reefs being large, which is one great factor in making a big mine, it is the intention of the management to erect extra stamps; and with the increased yield to the ton, this mine will show a great improvement in the future; but the debt is so very heavy that it will be a long time before dividends are paid.

##### Comet Mine.

The results in the past show that a profit of fully 16s. per ton will be obtained, and as the reefs are of a decent size, a large mill will be easily kept going, at the same time, there are patches in this district that will only give a very small profit.

##### Ginsburg Mine.

The assays from the Western block have lately proved disappointing, and there is no doubt that for the future the East block will be the future mine. There will be an amalgamation with the adjoining mines, but the immediate future is not bright.

##### Luipaard's Vlei Estate.

The pannings from this estate have been, so far, disappointing, and it is doubtful if ever a profit more than a few shillings per ton will be obtained.

## Princess Estate.

The prospects of this mine are not so bright as they were some months ago. Then, again, the reconstructors have the right of taking up 30,000 shares at par, in lots of 1000 at a time, so there may be a tap on in this direction.

## Modderfontein.

The present returns will give a very small profit on the present market price of the shares, but as they have such a large tract of gold-bearing ground, the shares cannot be considered too high, especially as the ore is of such high grade.

## MEETINGS OF MINING COMPANIES.

## THE COLAR CENTRAL GOLD COMPANY, LIMITED.

## A new property in prospect.

THE eighth ordinary general meeting of the shareholders of the Colar Central Gold Company (Limited) was held on Thursday, at Winchester House, the chair being occupied by Mr. MALCOLM LOW, D.L., J.P.

The SECRETARY (Mr. R. S. J. Spilsbury) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, I beg to move the adoption of the report and accounts, and, in doing so, I may say that we can scarcely be surprised at the very small gathering we have here today, since it must have been quite clear to all our shareholders that, under the circumstances, I can have very little indeed more to tell you than what you have in the report. With regard to the accounts I have only to say that the extremely small amount incurred during the year in expenditure for the purpose of keeping the company together is more than covered by our receipts. We have, of course, been keeping in view the object avowed and approved at the last meeting, which is to submit a plan worthy of the acceptance of the shareholders for the reconstruction of this company, and the working of a new and promising property in Mysore. We have had various properties under our consideration, but have not yet been able definitely to determine upon any one possessing the double qualification of being in itself sufficiently good and of being obtainable on reasonable and advantageous terms. Now, although we do not like to say anything positive on the subject, I may tell you that we are in very strong hopes of succeeding in carrying out our object in the course of the next few months, when we shall hope to have the pleasure of calling the shareholders together with the view of consultation upon a scheme which shall be at once good and definite. With these few remarks I beg to move the adoption of the report and accounts.

Mr. W. H. LONG seconded the motion.

Mr. PETERS asked whether it would not have been possible to put rather more matter into the report, which really conveyed hardly any information at all as to the workings for the past year.

The CHAIRMAN: I can positively assure the gentleman who has just spoken that when we submit our scheme for the approval of shareholders we shall go into the very fullest detail, and give every sort of information which can possibly be brought to bear on the subject. With regard to the past year, although we have as a matter of fact done a very great deal in the way of investigating the different properties brought under our notice, you must remember that until our efforts succeed it would be perfectly useless, and, in some cases, detrimental to go into negotiations which either have been abortive or remain uncompleted. At the general meeting it was plainly the sense of the shareholders that we should endeavour to find a new property. We have been doing all we can in furtherance of that object. I don't think there is any reasonable ground for complaint, especially when we say we are now within view of a scheme worthy of the approval of the shareholders.

The motion for the adoption of the report and accounts was then put and carried unanimously.

The retiring directors, Mr. Malcolm Low and Major-General G. De La Poer Beresford, having been re-elected, and the auditor, Mr. A. S. Hicks, re-appointed, the proceedings concluded with the usual vote of thanks to the Chairman.

## AUSTRALASIAN GOLD EXTRACTING COMPANY, LIMITED.

## The Ravenswood Mine to be vigorously opened out.

The fourth general meeting of the shareholders of the Australasian Gold Extracting Company (Pollok Patents), Limited, was held in Glasgow on Monday.

Mr. WILLIAM CLARK, M.P., who presided, in moving the adoption of the report and accounts, said he had to express his regret at the unavoidable absence of the Chairman (the Lord Provost) owing to the pressure of public business; and also that Mr. Jacks had been obliged for the same reason to resign his seat on the board. Turning to the account, the shareholders would notice that in the home balance sheet the amount of calls outstanding was reduced to £1587, after deducting the sums received subsequent to August 31. That amount had been still further reduced by £40 received since the balance sheet was printed. In the Ravenswood profit and loss account, while the loss for the year appeared as £4053 9s. 2d., the ordinary working expenses, strictly speaking, only exceeded the revenue by £1985, the balance of £2069 being extraordinary expenditure and amounts written off, of a character not likely to occur again. Of course, the directors would have to keep the machinery in repair, and renew from time to time such of it as was worn out or became wasteful. He might here mention that the directors had been obliged to order three new boilers for the mill. The old ones had been a source of constant trouble and expense for repairs besides loss of time in crushing, thereby reducing the output of bullion without any corresponding reduction in the wages list. The new ones were of a more suitable type, both for the class of fuel burned and for the water used, which carried lime in solution. Moreover, they were of sufficient power to supply steam, not only for the mill engine, but also for the winding engine, with a margin to spare enough to permit of their doubling the present stamping capacity, should that be decided on later. The directors would also effect a considerable economy in the consumption of fuel. That matter was pressing, and the directors trusted that they would have no more trouble with the machinery. As to whether the prospects of the concern were any better now than when the shareholders were called together in September the time had been short to expect any marked improvement, but from the returns since received and published in the newspapers the directors thought they were. The quality of the ore had improved from 13 dwt. to 16 3 5 dwt. per ton, and the probabilities were in favour of a further improvement, owing to the probable widening of the reef, as well as better ore, similar to what was passed through in sinking the shaft. It was not unreasonable to suppose that if the reef was wide and of good assay in the shaft they should also get a somewhat similar body of ore in the stopes on either side of it. Then, again, they had a year's reserve in sight, and they had not yet reached the limit of the crushing capacity of the present ten-head battery. The manager said that he could quite well crush 300 tons per month more than he had been doing if he had sufficient concentrating plant, and he was endeavouring to arrange that by utilising the best parts of the five old vanners to make three serviceable ones, which would give him eight in all; and the directors were sending out material for belts, with which he expected to do better work than hitherto. No increase in the surface staff would be required to attend to the larger output. All

the extra expense would be the cost of mining so many more tons. Therefore, the oncost per ton of ore treated would be reduced to five-eighths of what it was at present, or little more than half; and as the mine had been practically paying expenses for the past four months, exclusive of development, he thought that with the increased crushing they would be able to cover all expenditure and develop the property, seven-eighths of which was practically untouched. The directors, therefore, strongly impressed upon the shareholders the propriety of pushing on the development of the mine, so as to open up the reserves of ore still further ahead of the present crushing capacity, and sufficient to justify the erection of other ten stamps, for which there was ample driving and steam power with present engine and the new boilers. The present staff was quite sufficient to look after them, and thus the oncost per ton would be reduced by half, and the margin for profit correspondingly increased. They had better ore at a good few pennyweights than many of the dividend-paying mines in the Transvaal, and there was no reason why they should not also be able to attain the same success if they pursued the same policy as them—namely, that of vigorously opening out the mine and adding to the crushing capacity from time to time as the development justified it. A lot of money had been spent which in the light of their present knowledge might have been very profitably spent in the mine. They could not recall that, but they would try to recover it, with a reasonable chance of success, by giving their energetic manager, Mr. O'Gorman, the opportunity of doing as had been indicated. Of the £3000 which the board were authorised to borrow there had been spent to date the sum of £1152, including £420 for development expenses in November, and they would further have to pay £740 for the new boilers, so that if they were to go on, and the board were of opinion that it would be very unwise to do otherwise, they thought that their hands ought to be strengthened and their borrowing powers increased to £7000 or £8000 to enable them vigorously to carry out the policy recommended.

Mr. M. C. THOMSON seconded the motion.

After some questions had been put and answered in reference to details in the accounts,

A SHAREHOLDER asked what steps, if any, had been taken to get in the outstanding calls, for these seemed to be more than the directors were asking powers to borrow.

The CHAIRMAN said that every possible step had been taken, but disasters occurred, and in these cases some people had really lost all and could pay nothing.

Another SHAREHOLDER asked if the ore was being treated by the Pollok Patents process.

The CHAIRMAN: None of it. The results were being obtained by the free gold and Plattner process.

A SHAREHOLDER asked whether, seeing the Pollok patents process was laid aside, any portion of the £125,000 paid for it could be recovered.

The CHAIRMAN said that the parent Pollok Patents Company was in liquidation, and as regarded them he did not know whether the shareholders of that company were to receive a large dividend.

A SHAREHOLDER asked if, in the candid opinion of the directors, there was a scintilla of a possibility of this concern ever paying a dividend? If not, why should they go on spending money? Was it not better to lose what they had lost right off? The very fact of the Pollok patents turning out such a fiasco was enough, unless the directors thought there was a prospect of getting something out of this cauldron of loss. He would like to know if the directors could give their candid opinion that there was a likelihood of this coming to be a paying concern.

The CHAIRMAN said the directors were unanimous in the opinion that, having gone so far, and as the working expenses were no more than the amount derivable from the mine, it would be a great pity, seeing there was a chance of making still more money, that they should hold their hand at the present time. (Applause.)

Mr. PATERSON said that comparing their progress with that of the Sheba Mine the prospects were good enough to induce them to go on. All they wanted was to see the mine a little better developed, and to put through a larger amount of ore; and if that were done he believed the mine would pay as well as others.

A SHAREHOLDER asked if it was possible to form any estimate of the richness of these reserves that were reported on.

The CHAIRMAN said they could only obtain a knowledge of that as the development went on.

The report was then put to the meeting, and adopted.

On the motion of Mr. A. C. HOLMS, seconded by Mr. GEORGE PATERSON, Messrs. David Bruce and Robert Paterson were re-elected directors, a SHAREHOLDER remarking that although his remarks had no application to Mr. Paterson personally, he had to protest on principle against any stockbroker being on the board of directors.

Messrs. Maclean, Brodie, and Forgie, C.A., and Mr. W. Robertson Strong, C.A., were re-elected auditors.

A vote of thanks to the Chairman closed the meeting.

## VAN RYN GOLD MINES ESTATE, LIMITED.

## An offer for Van Ryn West accepted.

An extraordinary general meeting of the shareholders in the Van Ryn Gold Mines Estate (Limited) was held at Winchester House on Friday, "for the purpose of considering, and, if thought fit, of approving, an agreement which will be submitted to the meeting for the sale of a portion of the company's mining rights and property in South Africa." Mr. THOS. J. BEWICK (Chairman of the company) presided.

Mr. STUART J. HOGG (secretary) read the notice convening the meeting.

The CHAIRMAN called upon the solicitor to read the agreement.

The SOLICITOR here read the agreement.

The CHAIRMAN said: Gentlemen, the draft agreement which has just been read so fully explains the circumstances which you are called together to consider that there is little for me to comment upon. Believing that the Van Ryn Company has, outside what is now proposed to be transferred to another company, a sufficiently large area to work upon for many years to come, your directors did not hesitate to favourably entertain the proposal now before you, and after full consideration of the matter decided upon entering into the preliminary arrangements embodied in the draft agreement read by your solicitor, but which, of course, is subject to your approval. By the scheme you, as shareholders in the Van Ryn Company, will receive 60,000 out of the 160,000 shares, the total capital of the proposed new company, that is, three-eighths of the whole, without contributing anything except a portion of your property. I may here mention that that part of your property in the Mynpacht, which is known to be gold-bearing, is equal to a little over 200 claims, each claim being taken at 400 feet by 150 feet, and of this about 95 claims are proposed to be transferred to the new company, leaving 105, or thereabouts, in which to continue your operations. The arrangement does not interfere with the present earning power of your undertaking, nor does it affect your rights over the very large area owned by this company to the north and east, which it is possible may be found to be gold-bearing. Compared in area with other Rand companies, the proposed undertaking is most favourably circumstanced, and, in other respects, stands well. It is an outcrop property, and no deep sinkings and expensive machinery are needed. We are of opinion that ample funds are being provided by the new company for the development of the area on which, hitherto, only one mine out of four has been worked to any extent. The reef in the portion proposed to be transferred are the same as those worked by the Kleinfontein and New Chimes Companies, and favourable returns may be anticipated as soon as the new company commences crushing. By the proposed arrangement you are without delay getting this portion of your property wherein you are not at present carrying on any operations, proved without outlay on your part, and yet at the same time you benefit to the extent of three-eighths in the entire profits of the proposed

new company. In addition to the 60,000 shares acquired by you as a body, each shareholder has the opportunity of taking up shares in the new company in proportion to his holding, in this company at £10s. per share, or 10s. premium. Any shares not taken up by you are, I may say, guaranteed by responsible people at 30s. per share, so that the flotation of the new company is a certainty. No promotion money has been, or will be, paid. Your directors, through me, submit the proposed arrangement for your approval. The scheme has our unanimous endorsement, and in our interests we recommend it for adoption. Should any of you desire further information, we are prepared to answer any questions which you may be pleased to put to us. With these few remarks I move the resolution of which you have had notice. (Cheers.)

Mr. VAN RYN said: Gentlemen, I beg to second the resolution. As a very large shareholder, I think it is for the benefit of the company. I can congratulate you at present on the position the company occupies. It has £60,000 in hand. We have not made very large profits during the last few months, but that is on account of our mill—it's distance from the mine and cyanide works. The profits ought to have been £1500, instead of which they only represent £1000, because we had to give £500 to the company that erected our cyanide plant. I think, even with this £60,000, we are well ahead with our development work, but we require that money to put up another heavy mill, and also cyanide works, so that we may not lose any time in developing our property. I do not know if you are aware of how large the Van Ryn property is. We have in our Mynpacht eight million tons of ore, and if you work these with a 50 stamp mill, it will take you 160 years to exhaust, but if you work with a 100 stamp mill, it will take you 80 years. We can well dispense with the rest of our property, and what the shareholders part with they are going to get a good share of back. The shareholders will get 60,000 shares, and besides that they will have the right to subscribe for a further large proportion at a premium. I think that will give us ample capital to develop this part of the property, and it will be a benefit to the company, because it is impossible that this company can work all this large property themselves. Therefore, I, as a large shareholder, have much pleasure in seconding the resolution.

The Chairman has not, however, told us that we have a very large Mynpacht, so that what we are parting with is but a small proportion of the large extent of ground we possess. We require the money we have for the development of our own property, and it is better that we should establish this sub-company.

Major COTTON asked the Chairman if, before the resolution was put to the meeting, he would afford them some particulars of an offer made; he understood, by the Chimes people.

The CHAIRMAN: I will first answer the question as to the other 50,000 shares. It is optional for the guarantors to take those up at 30s. within two years, or twelve months after the commencement of crushing. With reference to the Chimes Company, their capital is now £100,000, and they propose to increase it by £120,000, making a total of £220,000. Of the £120,000 shares we were to receive 60,000 shares, exactly the same as is proposed by this company, fully paid. Then there were 40,000 shares to be offered to the shareholders in the Van Ryn and Chimes Companies at not less than £2 per share in equal proportions, the issue being guaranteed by a syndicate. 20,000 shares were to be held in reserve, upon which the guaranteee syndicate would have the option for a time not mentioned. There was a remarkable condition in the offer, which was that the Chimes Company would have the privilege of going into our mine and testing it for three weeks after the completion of the unwatering, and then they could say "yes" or "no" to the whole agreement. That, I think, was a condition that I could not recommend to Van Ryn shareholders. (Cheers.)

Major COTTON asked who the guarantors referred to in the resolution were.

Mr. TRENCH: The guarantors are the New African Company—successful and responsible parties.

Mr. HOLMES: I am instructed by Messrs. L. Hirsch and Company, on behalf of clients, to make an offer for the consideration of the meeting, which we consider to be a much better proposal than the one already submitted—that is to say, they will form a company with a capital of £170,000. They will give the Van Ryn Company 70,000 shares of £1 each, and guarantee 50,000 shares of 30s.—these to be offered to the Van Ryn shareholders, and for the same period as is mentioned in the guarantee they will take the refusal of 50,000 shares further at 32s. 6d. per share. That would give to the Van Ryn shareholders 10,000 shares more, of the equivalent value of 30s., £15,000, and the option would beat 2s. 6d. better than the price that you have heard read. We are prepared to enter into a proper contract for the purpose of carrying out this proposal if it should be the wish of the meeting, and I think it should be accepted.

The CHAIRMAN: Have you that proposition in writing?

Mr. HOLMES: I am prepared to put it in writing. Mr. SISTERSON supported the scheme as read by the solicitor to the company. In his opinion, the directors had carefully considered the matter in the interests of all the shareholders, and he thought the scheme provided by the board should be adopted by the company. He thought it very unfair that at the last minute a new scheme should be put before the shareholders, and if any modification of that embodied in the resolution before the meeting were necessary, he thought the New African Company should have an opportunity of making such modification, and adapting its proposals to agree with that just put forward.

Mr. HOLMES: I think it is rather unfair to make any strictures upon our not coming forward when it was impossible to do so, because the notice gave no particulars upon which any offer could be based.

Mr. TAFF: I quite agree with Mr. Sisterson that after an agreement has been discussed by directors, it is somewhat inviolable to make a better offer, but there is one important difference in this case—namely, that when the notice convening this meeting was issued the whole of these particulars should have been laid before us so that they could be discussed. (Hear, hear.) I am personally interested in a small way in the lesser offer, and, therefore, my interests are that the offer should go through, and that the alternative and better offer should be refused; but I must say that, speaking as a broker who has clients in the country, when an offer is made like that we have just heard, it should be fully before us, and be allowed to be discussed in the Press, so that gentlemen who do not like the offer may have the opportunity of opposing it. I am sure the clients of Messrs. Hirsch and Co. are powerful people, who it would be to our advantage to have join us. I would suggest a compromise—that the gentleman who made the first offer and the clients of the Messrs. Hirsch should meet and submit a joint offer to the whole company, and I am not certain that, considering the Chimes offer was £2 a share, this subsequent offer might not be better. I do think that a syndicate should be formed to give us the 50,000 shares at £2 each. The property is most valuable. I believe that recently a part of the reef running into our ground ground has been proved for a length of 1250 feet from where the Kleinfontein Company is worked, and that the leader, although narrow, assays up to several ounces to the ton. I suggest the adjournment of the meeting, and that Messrs. Hirsch's guarantee, and that is the possession of the directors should be considered jointly by those submitting them, and refer the whole matter to us, in which case I believe a much better arrangement can be come to.

Major COTTON: I am quite with Mr. Taff with regard to the meeting being adjourned, so that the shareholders can be informed of the offer that is made for their property. I asked at the office for the terms, and I could not get them. I was told something very indefinitely, and have heard nothing more. I speak for the independent Van Ryn shareholders. I think they should have the offer of the property themselves, and be allowed to find the money by subscribing, and that they should also keep the option of the additional shares. I have spoken more than once against these hole-in-the-corner arrangements. I think this is not at all a proposition that meets with the approval of the independent shareholders. I do not know the New African Company, but, of course, there are certain persons who do. They are able to get their friends here to support the motion, and are able to carry what they want, but the Van Ryn shareholders do not know what is going to take

place, I think certainly the meeting should be adjourned, and if there is anything good in the mine, as I believe there is, that the Van Ryn shareholders should have the option of getting it for themselves, and not have a large number of shares cast away from them, as was done in the case of a previous large option. I say this in the interests of the independent shareholders, and I repeat that I object to this hole-in-the-corner business.

Mr. SISTERSON: I am as independent a shareholder as Major Cotton, but I do consider that when a proposal like this is put before a meeting for the benefit of the shareholders, that no time should be wasted by an adjournment. Major Cotton talks as though we were giving away the Van Ryn property. We are doing nothing of the kind. We are simply endeavouring to arrange a scheme whereby intelligently the whole of that property can be worked. You have upwards of 600 acres. You cannot work all of this yourselves, and this is a means whereby you can get other people, on terms advantageous to yourselves, to work part of it. The shares are all to be offered to you in the first instance. If that is the case, how can you be parting with your property? Is there any gentleman in this room connected with the African Company who will guarantee a further 10,000 shares, as the other scheme suggests, and will he guarantee the extra 2s. 6d. on the 50,000 shares option? It is simply a question of 2s. 6d. and 10,000 shares. Let us get to work, and do not let us wait the 100 years of which Mr. Van Ryn talked. (Laughter.)

Mr. TRENCH: I do not understand why it is that the friends of Mr. Hirsch make an offer when they know that the board have already accepted one by the New African Company. The real question at issue is, have the Van Ryn shareholders been satisfied with the direction of their affairs? If so, then they will have the assurance that the new company is to be managed in the same way, and the mere trifle of whether they get 10,000 more shares or less is as a bagatelle in comparison with the management of the property. If that management is to be on the same satisfactory lines as Van Ryn, it ought far to outweigh any pecuniary consideration or any matter of £10,000 or £20,000. That is the real key of the question. Are we going to have the same management and the same satisfactory results? If so, the higher bidding is as nothing compared with that one important fact. (Cheers.)

Major COTTON: To say that we are unable to work that property is a mistake. With our shares at the present price we can command as much additional capital as is necessary to work the property, and to give the bonus of whatever may be the difference between the price at which the shares are issued and the present price to the New Van Ryn shareholders. I think the board ought to see what can be done for their own shareholders instead of what can be done for the New African Company or anyone else by giving the call conditionally of the shares, which may, and I believe will, reach a very high price in the future. The independent Van Ryn shareholders ought to be considered in this matter, and allowed to have any option of taking their additional shares instead of other people. We are quite able to raise the additional money required to work the property with our shares at the present price.

The CHAIRMAN: We have done, and are doing, all we can in the interests of the shareholders. (Hear, hear, and cheers.) I trust you will withdraw that implication.

Major COTTON: I have not made any implication.

Mr. VAN RYN: If the shareholders put up the money they are not going to work the property; whereas, if we get the new company formed, the shareholders will get the benefit of that new working arrangement by clever people in Johannesburg. As a large shareholder, I would rather take the offer from the New African Company than the one that has been made.

Mr. OCHS: As one very largely interested in the New African Company, and speaking on his behalf, I may say that this scheme has had three months' consideration by our engineer, Mr. Magin, in Johannesburg. He has been in a great measure responsible for the improved results of the Van Ryn Company, and has recommended that that company part with this little western portion to a sub-company, as we have ample capital to put up largely increased stamping power over the property we keep. We approached the Van Ryn directors, and submitted an offer which ultimately took the form that has been submitted to you to-day. We quite expected to hear that this offer would be bettered, and we knew it would be. We are quite prepared for the little further offer of 2s. 6d. on the 50,000 shares, and the 10,000 extra shares to be given to Van Ryn shareholders. On that basis we are quite prepared to do the business and sign the agreement at once. (Loud cheers.) It was suggested by Mr. Tapp that we should meet the other gentlemen. We certainly decline to do anything of this sort. I may tell you, Mr. Chairman, that these gentlemen have been trying to meet us all the week; not actually Messrs. Hirsch and Co., but the persons we believe they represent. It is one thing to reconstruct a company and have money to work it, and it is another thing to manage it properly. We propose to manage it properly, and to make a success of it. If we come to an arrangement with these gentlemen, there will be another half-crown offered by somebody else, and possibly another beyond that. A friend behind me suggests that it is simply a game of "poker." Will you be good enough to vote? We are prepared to stand by the modified arrangement, but will abide by whatever you may decide. (Cheers.)

Mr. HOLMES: I am instructed to say that in all probability our clients will be prepared to increase their offer substantially. (Laughter and cries of "poker.")

A SHAREHOLDER said he could not see why the company hesitated about accepting the best offer, from whatever quarter it might come; but he thought the best offer was that which embodied the scheme most likely to work satisfactorily, and for his part he should most certainly endorse the suggestion made from the chair. (Calls of "Vote.")

Mr. RIES moved the adjournment of the meeting for 14 days, but the motion was negatived.

Mr. RIES interposed with another offer, and said that he was prepared to give the Van Ryn shareholders 80,000 shares, and to guarantee the 50,000 reserve shares at 3s. 6d.

The SOLICITOR to the company said these offers were not before the meeting. It was open to the shareholders to adopt or reject the resolution framed, and now to be put by the Chairman, with the following addition:

Subject to such agreement being amended by increasing the capital of the new company to £170,000 and by giving 76,000 shares of the new company to the Van Ryn shareholders, and the new company obtaining guarantors for the second 50,000 shares at 3s. 6d.

The amended resolution was then put, when 12 shareholders voted for its adoption and 10 against.

Mr. NEUMANN desired to record his protest against the manner in which the resolution had been carried and the meeting had been conducted.

The proceedings then terminated.

**Vaal River Diamond Company.**—The sixth ordinary general meeting of this company was held on Thursday, at Winchester House.—Sir Edward Thornton (the Chairman), in moving the adoption of the report and accounts, said the revenue had been depleted by proceedings it had been necessary to take against squatters, but it was hoped that the firm hand shown in that matter would bear fruit in future dealings with them. During the past year the directors had been in negotiations with parties in this company for dredging the river in search for diamonds, and for gold prospecting, and they were still pending. The directors had made every effort to keep down the expenses. They were working without remuneration, and the secretary (Mr. Thomson) had not drawn anything either for his services or for office rent, showing that he shared the confidence of the directors as to the future of the company.—The motion was seconded by Mr. L. B. Twentyman, and carried.

## CAYLLOMA SILVER MINING COMPANY.

A satisfactory position of affairs.—A vast and valuable property.

An ordinary general meeting of the shareholders of the Caylloma Silver Mining Company (Limited) was held yesterday at the Cannon-street Hotel, the chair being occupied by Mr. H. H. HAMMOND.

The SECRETARY (Mr. G. M. Bowen) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, Mr. Hopkins, who should have presided upon this occasion, has, I regret to say, been confined to his house for a time by serious illness. He is, however, now progressing satisfactorily, and I expect ere long he will be able to resume his seat on our board, where his great experience, judgment, and ability have so often proved of importance to us in our deliberations. I have also to express to you the regret of the board at the lateness of the time at which we have summoned this meeting. The delay has, however, been occasioned by circumstances entirely beyond our control, which we could neither foresee nor provided against. At the time when our books were being closed at the mines our general manager, Mr. Meincke, was suddenly struck down by apoplexy, and, I need scarcely say utterly and completely incapacitated from attending to business. Every possible assistance was rendered to him by our medical officer, and he had to be removed to a more genial climate on the coast, and I much grieve to say he is still lying prostrated in Lima, without any immediate prospect of any permanent improvement. Turning to the accounts which we present to you, I need scarcely offer any comment on our general balance-sheet, where the figures explain themselves. With regard, however, to the revenue account, you will notice that the net proceeds of our shipment of ores and bullion sum up to £52,464 4s. 2d., and adding the small amount of £12 10s. for transfer fees, we reach a total of £52,476 14s. 2d. On the debit side our ordinary expenses amount to £34,060 14s. 3d., and we have further agreed to write off from production the sum of £13,000 for mines development, reconstruction and improvement of mill and buildings, and depreciation of plant, machinery, and buildings. Notwithstanding this, the total results of the year show a profit of £5496 17s. 8d., besides enabling us to carry forward a balance of £13,428 13s. 7d. I may, however, add that this does not exactly represent the true position of our affairs, because we have not taken into consideration the value on our milling ores at the mill at San Ignacio, or a smaller quantity of the floors of the Toro Mine. At a moderate computation I would put the value of these ores at £6000. Reckoning this, we really bring forward a balance of about £19,000. In April we carried out our promise of declaring a dividend provided the results of the working for January and February should, as we foreshadowed, enable us to do so. That dividend absorbed £6250, leaving a balance of £12,675 11s. 3d. to carry forward. Under the circumstances I think we may fairly consider this to be a highly satisfactory state of affairs, for we have had several difficulties to contend with. In the first place there has been the serious fall in the value of silver, and secondly, the temporary suspension of the working of the Toro Mine. As to the former, I may mention that in 1892-93 the net yield of our ores amounted to 31,164d. per ounce fine. In 1893-94 the net yield was 26,679d. per ounce fine. That makes a difference of 7,485d. per ounce fine, or nearly 22 per cent. Now, as to the bullion, the price realized was 34,687d. per ounce standard, and, adding to that 5 for gold, we bring up the price to 35,062d. per ounce. For 1894 the yield was worth 29,930d. per ounce, a difference of 5,132d., or nearly 14½ per cent. Now it will, no doubt, strike you that the yield of the bullion has been more advantageous than the yield of the ores, but this is accounted for by the fact of our having retained several remittances on the coast and at the silver coin in Lima, which, owing to the state of the exchange at the time, was far and away above the intrinsic value of silver, we carried out some very lucrative operations. These we should have been glad to continue, but great differences in exchange and the value of silver would not continue for any length of time. However, such differences do frequently happen, and eventually, according to the last account, the exchange was far and away above the real value of silver. Owing, however, to Peru being in a state of revolution, and of the opposition forces surrounding Lima, we did not think it prudent to land any more of our bullion in that country, but brought it into the English market. When Peru gets pacified, however, we shall be able to renew our operations when favourable opportunities offer. I may mention, also, that the yield of gold extracted from our ores in 1893 amounted to £3309, while in 1894 it amounted to £3642, or an increase of about £340 over the previous year. I may mention that the value of the gold extracted from the ores pays for all revenue or returning charge. Turning to the mines, I am glad to say that we have here to-day Captain Oates, who has very successfully and satisfactorily managed all the underground workings of our mines at Caylloma, and I am sure he will be glad to answer any questions you may care to put to him. As you will have seen from our report, the Toro Mine has unfortunately received such an influx of water from a neighbouring mine that towards the end of February it was found utterly impossible to continue working the lower levels, which were completely inundated. This difficulty arose from the inability of our neighbours to continue pumping. We ourselves at that time had good pumps at work, and under ordinary circumstances—that is to say, with our neighbours pumping, we should have been able to keep our mine sufficiently dry to work the lower levels. Owing to this influx of water we lost, practically, five months of the year now under review, as our output fell off very considerably from February up to the end of June. While it does not concern the period we are now reviewing, I may mention that during the three following months also we had a very bad output. In fact, the output was not sufficient to cover expenses. We have, however, now come to an arrangement with our neighbours—it was concluded, I believe, in August last—to continue joint pumping, and the immediate result was a great increase in our output. September showed a trifling increase, whilst October and November proved to be record months. The output from the whole of our property for the first six months of the year averaged about 43,000 ounces fine per month. In January the output was telegraphed at 43,500 ounces, so that, under the circumstances, we believed ourselves justified in declaring a dividend of 1s. per share, which we paid in April. At the time it was an open question whether it ought not to be a larger sum, but fortunately, as things have turned out, we decided on that amount. At the Toro Mine our prospects are very encouraging. Our latest advices—received on 24th inst.—speak most satisfactorily, and before concluding I shall just read you the telegram as we have received it, so that you may be able to draw your own conclusions. In addition to the difficulties in regard to water, we have had further difficulties with our neighbours as to the boundaries. Last year I mentioned the matter, and expressed the hope that it would be amicably settled. Unfortunately, further questions cropped up, and in order to arrive at a definite conclusion we were advised by our Lima agents to submit the matter to arbitration. An expert was named as arbitrator, and after going thoroughly into the question he sent in his award, which leaves us practically in the same position as we were in before. We lose about a yard of surface and gain a yard in depth. The conditions, however, have taken the form of a legal document, which is the most binding engagement that can possibly be made in South America. In addition to this Toro Mine we have been working an extensive lode on the Trinidad vein, and also we have been commencing to sink a shaft on the great master lode of the district called the San Cristobal. In regard to the Trinidad we have obtained a fair quantity of milling ores, but the result of the whole has not corresponded with our expectations, and our manager, Mr. Lawson, who is now in charge of the company's interests, has deemed it advisable to suspend working during

the rainy season on that lode and concentrate his efforts more on the Toro Mine and on the Santa Cata shaft. I may mention that Captain Oates has a very high opinion of the Trinidad lode, and expects great things of it. The Santa Cata shaft was commenced about eighteen months ago. The opinion of various experts was that when we got to about 100 m. tress we should strike the old workings of the Spaniards, and it was hoped that we should find a lode bearing good quantities of silver. So far as striking the lode was concerned, the predictions of Captain Oates have proved to be correct, and reports, both written and cabled, show that the prospects here are extremely satisfactory. Of course, we cannot expect any great results just at the moment, as the machinery has to be erected and the pumps arranged. We fully anticipate, however, that in the course of a month or two we shall begin to see some fair results. At the Toro Mine we have had difficulties with the neighbours, both as regards the boundaries and as regards the respective duties as to pumping. A compromise has been effected, but in order to avoid a repetition of the difficulties we have thought it advisable to obtain possession of the various claims on the great San Cristobal lode, thus rendering our position absolutely secure. With regard to the mill, I may say that the result of its working has been satisfactory. After crediting the mines with £3925 for ore which, unless worked on the establishment, would be absolutely valueless, the result for the year shows a profit of £361. We have had considerable trouble with the first 20 head of stamps erected under previous management. In fact, the foundations were found to be too weak, and as a consequence the stamps have had to be taken down and re-erected at very considerable expense. By the latest news it appears that about 15 head of stamps have already been put up, and that an additional 5 stamps remain. In addition to this, another 10 stamps which were lying idle, have been brought to San Ignacio, and have been erected and re-erected to our entire satisfaction. We require a good stock of fuel to work our mill, and we have obtained possession of a very valuable shale mine, which will probably prove of great value to us. Until now we have had to take up supplies of coal from the coast at great expense, and if now we can make ourselves quite independent of foreign coal we shall be pretty safe. I will now read to you the cable we have just received from our manager at San Ignacio: "Toro Mine progressing favourably. Ore is improving in bottom of the mine. Shaft is 350 feet down. Sinking progresses at the rate of 32 feet per month. Pumping plant and machinery work well. Native carriers arriving with moderate supplies of coal.—Santa Cata Mine: Prospects are encouraging. Pumping will be started on December 22nd. Shaft is 375 feet down. Two turf deposits denominated in the vicinity of the Santa Cata Mine. Carabuiri Shale mines seem improving in quality and quantity. Production increasing; expenses of mining reduced. Referring to our letter of October 20, petroleum well; denominated five claims. Mill: First battery re-erected; 25 head of stamps working in order. Fourth furnace will be able to start work in 14 days. San Ignacio turf opposition withdrawn; expect to repay last month's production, and the expenses will not exceed £3000." This information I regard as highly satisfactory, and I may tell you that Mr. Lawson is not a man given to exaggeration. He always does more than he promises to do. Should the prospects continue as satisfactory as they have been in the past, we hope the time is not far distant when we shall be able to declare another dividend, and, indeed, to make regular quarterly or half-yearly dividends. (Applause.) The Chairman concluded by moving the adoption of the report and accounts.

Mr. A. NAYLOR seconded the motion.

A SHAREHOLDER enquired as to the extent of the property, and whether it would not be advisable to get some co-operation in the working.

The CHAIRMAN replied that the properties of the company upon the San Cristobal lode alone were something like six or seven miles in extent. As to the formation of subsidiary companies, it was of the first importance that they should thoroughly test the property before proceeding to their flotation.

The motion was then put and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. NAYLOR, Mr. MacAndrew was elected to a seat on the board.

A vote of thanks having, on the motion of Mr. MACANDREW, been given to the staff in Peru, and the auditors having been re-appointed, the proceedings terminated with a vote of thanks to the Chairman.

## WEST AUSTRALIAN EXPLORING.

A successful start.—The subsidiary companies.

The statutory meeting of this company was held yesterday, at Winchester House, the chair being occupied by Mr. F. A. THOMPSON. The SECRETARY read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, as you have learned from the notice which has been read, a copy of which you have received, this is the statutory meeting of the company which we are compelled to hold within four months of its registration. We have, therefore, no accounts to present, and have simply met in compliance with the law under which we exist, and take this occasion to report to you the progress made by your directors. It will be interesting for you to know that we have acquired a number of properties in Western Australia, about which there is a consensus of opinion that they include some of the best mines in that country. Among them I may mention the Golden Crown, Cambria, and Salisbury, situate in the White Feather district, Coolgardie, and in close proximity to McAuliffe's White Feather Reward Claim, the shares of which are now selling at upwards of £2 on the market, and it is stated by many that the Golden Crown is equal in value to the Reward Claim. I may say that the transfer of this property upon the purchase by our company was carried through for us by the branch of the Union Bank of Australia, at Coolgardie, and the manager of that bank in a letter to this company states:—"I have had the shaft from which the prospectors were getting the gold battened down, as the stone is too rich to raise unless some responsible person is on the property." Since that letter was written our own resident engineer, having arrived in Western Australia, has visited the property, and reports upon it in most favourable terms. Amongst other things, he estimates that there is already developed ready for treatment £56,000 worth of ore. We have also taken over the celebrated Reisen's Reward Claim at the Broad Arrow, which has produced, and is now producing, some phenomenally rich rock. Our representatives have now gone to the Murchison district for the purpose of taking over the famous Mainland group of mines acquired by this company, consisting of the Mainland and the Last Chance. I am also pleased to say they have successfully negotiated for the purchase of the three claims intervening between the Last Chance and the Mainland, and upon the same reef, which greatly adds to the value of the last-named properties. In fact, this block of ground, comprised of the five properties, as we have been able to consolidate it, has often been described by various experts as the equal of anything in Coolgardie, and there can be no doubt whatever that they are looked upon in Western Australia as being the finest group in the Murchison district, and are frequently referred to as the Bayley's Reward of that district. They have already produced about £50,000 worth of gold, and are opening out in first-class shape as the development work progresses. Mr. E. H. Hallack, the well-known mining expert of the *South Australian Register*, in a recent letter to his paper, stated that he considered this field the best watered in Western Australia, and said that he saw at the Mainland "specimens which would compare favourably with the richest in the world, and would make Londoners' mouths water." Our own engineer, Mr. Charles Kaufman, a man of large experience in the inspection and working of gold mining properties who went to the field with somewhat pessimistic views, being hardly able to credit the reports received from other engineers as to the richness of these reefs, in a letter just to hand states that he is perfectly satisfied with what he has seen, and expresses the opinion that there

to a great future for the gold mining industry in that country. He is now in the Murchison district for the purpose of inspecting and reporting upon the Mainland group, and as soon as his report is received (probably during the coming month), our Golden Crown group at the White Feather and our Mainland group (as consolidated) at the Murchison, will be incorporated into separate companies, and private information regarding them will be sent to each of our shareholders at an early date. While we are in possession of a portion of these reports at the present time, you will quite understand that it would be injudicious to publish them at the present stage; or, as Her Majesty's Ministers would say, "It is not in the interest of the Government to disclose their contents." In this connection, however, I will state that all of the properties mentioned in our prospectus as having been secured by option at that time have, since the formation of the company, been taken up by us, and that the present development upon them more than confirms the good opinion then held of the same by our directors, and it is the belief of my colleagues and myself that the most sanguine expectations regarding the profits to be obtained from these properties will be more than realised. The idea I mean to convey by this being that no options were acquired or used merely for the purposes of the prospectus, but that the properties mentioned as having been secured by option of purchase, at the time of issue, were taken after the most careful investigation possible to be made under the circumstances, and with perfect *bona fides* on the part of your board, and it is a pleasure to be able to state that they all, thus far, give satisfactory evidence of successful results upon further development. We have, in conjunction with the Gold Fields of West Australia (Limited) and the Pioneer Syndicate, acquired from the London and Western Australian Exploration Company a portion of the option held by the company on the Great Flingal reefs, situate to the north of the Kurnalpi Gold Fields, on most favourable terms. This is an enormous property consisting of 264 acres so located as to give us about 3 miles on the line or strike of the reefs, and as the company in whose name the option was acquired have exercised their right of purchase, upon the advice of their engineers upon the spot, after thorough investigation, we may look forward with confidence to a handsome profit on our investment from this source. The company have other smaller investments in different districts, chiefly in the White Feather, of such a nature that your directors are confident the same will yield good profits to the shareholders. I might occupy more of your time by discoursing upon the most favourable results obtained by the development work now going on, and of the new discoveries being made, but I deem it sufficient at the present time to state that at no point where good legitimate development work is being carried on is anything but the most satisfactory results being obtained, and, in conclusion, I will say that your board have every confidence in their ability to successfully manage the affairs of your company, and to pay you an interim dividend of a substantial character—say at a rate of not less than 20 per cent. within the next 90 days for the first half-year, and that you can at all times rely upon their united and unremitting efforts on your behalf. I have to thank you on behalf of the board for your confidence thus far displayed, with the firm belief that it has not been misplaced, and further, for your attendance here to-day, coming as it does in holiday week. I may say that Mr. Moreing has been asked to make a report on the Golden Crown, and he states that he has just received a cable from Mr. Hooper, his representative, and his report confirms that made some days ago by Mr. Kaufman.

Mr. HALE thought it of the first necessity that when the properties owned by the company were floated they should be kept more or less to the shareholders in that company. (Hear, hear.) He should like also to have a statement as to the number of applicants for shares in the capital of the company, and the nature of the allotment. It might have been stated that over 900 applicants had applied for the 100,000 shares, while to-day they had about 1000 shareholders, which would give an average holding of 100 shares each. When the capital necessary for the development of the properties to which allusion had been made was offered for subscription, they would recognise the importance of the subject to which he had drawn attention. He hoped, too, that in the event of any of the other West Australian companies being in need of capital, the directors would take advantage of any opportunities that might offer for the judicious investment of capital.

The CHAIRMAN, in reply, said the applicants for shares had originally numbered a few over a hundred, while with the more recent transactions in the shares the shareholders on the register would number over 1000. It was certainly the intention of the board to give the shareholders the first opportunity of either guaranteeing or supplying the money which would be required for the handling of the subsidiary companies. Their representatives on the other side would at the same time keep a keen eye on any opportunities that might occur of getting hold of anything that would be advantageous to the company.

A SHAREHOLDER asked when the prospectuses of the new companies would be in the hands of the shareholders.

The CHAIRMAN replied that they would be received in a fortnight at least.

The proceedings concluded with a vote of thanks to the Chairman and directors, moved by Mr. J. CAMPBELL, seconded by Mr. BEALE, and carried unanimously.

### THE CARRINGTON GOLD MINING COMPANY, LIMITED.

The corner turned.—Hopeful speech from the Chairman.

The third ordinary general meeting of shareholders in this company was held at Winchester House, Old Broad-street, yesterday, Mr. SINCLAIR MACLEAY in the chair.

The SECRETARY (Mr. Charles C. Rawson) read the notice convening the meeting, and the report and accounts were taken as read.

The CHAIRMAN: Gentleman, we have been circularising you pretty freely lately, and we have given you nearly all the information we can. We wanted you to know everything that we knew, and we have called the meeting, therefore, rather late in the year. I am very pleased to be able to inform you that your board consider that they have now turned the corner in this mine. You will remember—as we pointed out to you—that we had to apply for exemption, our funds being exhausted. I may say that one of the reasons for doing so was that we wanted to see what the people in Charters Towers thought of this mine. Directly they knew the time of exemption was about to expire there were several applicants ready to take up the mine. Now that is a sure indication that the people on the spot think very well of it. Our own manager, of course, has the fullest confidence in the mine as we, the directors have, and we have had the opportunity of seeing over here lately Messrs. Mosman and Hollimer. Mr. Hollimer is recognised as being one of the best managers on that field, and Mr. Mosman, as you all know, is one of the gentlemen who first discovered that field and started it, and his opinion has very great weight. Both of these gentlemen consider we have a very good mine which only requires development, which our manager is hard at work doing. In his last letter he says he intends to push on as fast as possible—that letter only arrived last week—and we trust good fortune will attend his efforts. We have heard from him since then by telegram, which has been published in the papers. In that telegram he says: "Have begun driving east"—which we understand to be No. 1 east level, which has been driven 106 feet—"have let contract for 50 feet; everything is going well." This is on the Victoria lode, and as you know we have the Victoria and the Caledonian, both of which we are converting into our property. As we pointed out in our circular, an extract from our manager's report states:—"If we were in a position to work upon a larger scale, the mine would no doubt be

self-supporting in a very short time, when it is properly opened out and the levels and winzes have been driven and sunk." That is all we wanted to do. As I have said, we were waiting to see what the people on the other side would think, or say, of our property, and some of our largest shareholders were prepared with money to put into it if they saw that the local people had faith in it. I am glad to say that directly we got the information the money was subscribed—namely, £1500, as we have mentioned in the report. Even if more money is wanted there are gentlemen who believe in the mine so much—and I myself believe in it—that they will come forward and give us more money, but I do not think it will be necessary. I think we may congratulate ourselves now upon having turned the corner, and I hope when I have the pleasure of meeting you another year we may be able to place a satisfactory report before you. I will not take up your time by going through the accounts; they speak for themselves. There is an item put down in them for directors' fees, but I may as well tell you that the board has drawn no fees whatever. They are, however, due to them. The directors work very hard indeed for you in this company, but they stand in with the shareholders and have foregone their fees until the mine is in a paying state. With these few remarks I beg to move the adoption of the report and accounts.

Mr. W. J. WRIGHT seconded the motion, which was agreed to without discussion.

The CHAIRMAN: The next resolution is as to the re-election of a director. Mr. J. R. Clipperon retires, but is eligible for re-election. I am sorry to say at present he is laid up through the inclemency of the weather, and is rather seriously ill, so he is not present to speak for himself. I can assure you he takes the deepest interest in the concern, and attends daily at the office.

Mr. ASTLEY seconded the resolution, which was agreed to.

The CHAIRMAN: Mr. John I. Jacobs has been associated with us as a director of the company now for some little time, and I would ask you to confirm his appointment. He takes great interest in the mine, and is one of the gentlemen who have come forward to assist it financially.

Mr. ASTLEY seconded the motion, which was adopted.

Mr. ASTLEY proposed that Mr. Hercules Nicoll be re-appointed auditor, at a remuneration of 15 guineas.

Mr. C. F. GREENHILL seconded the resolution, which was agreed to.

A vote of thanks to the Chairman and directors terminated the proceedings.

### UNITED GOLD FIELDS OF MANICA.

The assets of the company.—A policy of cautious working.

THE second ordinary general meeting of the shareholders of the United Gold Fields of Manica (Limited) was held yesterday at Winchester House, the chair being occupied by the Right Hon. Lord GIFFORD, V.C.

The SECRETARY (Mr. H. Slaney) read the notice convening the meeting.

The CHAIRMAN, in moving the adoption of the report and accounts, reminded the shareholders that the original purpose of the formation of the company had been to exploit the Rezende reef. Good reports as to the reef had been received, and the only way to develop the property seemed to be to turn it into a company, of which they were all members. From the report, it would be seen that the reef, like many that had been exploited in the country, was broken. They had, however, continued working and developing cautiously under the advice of Mr. Alford. Up to the present they had driven 1479 feet at a cost that would compare most favourably with that of any other work in the same country. The testimony of disinterested persons recently returned from South Africa—and in some cases of the highest authority—went to show that the work was conducted in a most admirable manner, and that, in their opinion, the mine would turn out well. The mining commissioners, on the Chartered side, said without hesitation that the mine was one of the best developed, at a small cost, in the country, and that they thoroughly believed in it. Their operations had, to some extent, been interfered with owing to the war, many of the men having left the mines to join the forces. But whatever the difficulties against which they had had to contend, he was confident that the works at the mine had been carried out with the greatest ability. Everything, moreover, was conducted with the most strict economy. It had been the policy of the directors not to put their eggs into one basket, and upon that account they had taken an interest in one or two ventures. Among these they had acquired 3000 shares in the Penhalonga, which was very well spoken of. In addition to this they had an interest in what was known as Benny Taylors' concession. The latest advices from the mine were to the effect that the quartz was hard on both sides of the drive, and that the vein was still opening up well. They had been approached as to the water-rights on the property, and negotiations were proceeding in the matter, and would probably end in a manner very favourable to the company. In conclusion, he might mention that certain reductions had been made in the London expenditure, which he hoped would satisfy the shareholders as to the purpose of the board in observing the most strict economy. The Chairman concluded by moving the adoption of the report and accounts.

Mr. W. FARMER seconded the motion.

A SHAREHOLDER enquired to what purposes the £608, entered against preliminary expenses, had been devoted.

The CHAIRMAN said they were expenses connected with the liquidation and registration of the company.

The motion for the adoption of the report and accounts was then put and carried unanimously.

Major GORDON submitted a motion for the election of Mr. Hill to a seat upon the board, which was duly seconded.

Mr. CARRICK expressed the hope that the motion would not be carried. He was sure the board were deserving of every confidence, and to add to their number might create difficulties. Advice he had received from Mashonaland spoke of the admirable manner in which the works at the mine had been carried out.

Mr. H. H. THOMPSON cordially agreed with this view, and moved the following amendment:—"That the directors have the confidence of the shareholders, and that no additional director be appointed."

Mr. J. S. EDWARDS seconded the amendment, which was put and, on a show of hands, carried by a large majority.

Mr. CARRICK demanded a poll, which resulted in the defeat of the amendment by 20,780 votes, against 19,678.

The following motion was then submitted to the meeting:—"That whilst the meeting has the fullest confidence in the board, it is desirable that Mr. Ernest Hill be and is hereby appointed an additional director of the company."

This was put and carried by a show of hands.

The CHAIRMAN intimated that the board would take time to consider what course they should take.

A vote of thanks to the Chairman concluded the proceedings.

—The special meeting of shareholders of the FERREIRA GOLD MINING COMPANY (LIMITED), held at Johannesburg on December 21, has authorised the issue of share warrants to bearer. Application forms may now be obtained at the company's London office, 120, Bishopsgate-street Within, E.C.

—The directors of the SUCRE MINE (LIMITED) have declared an interim dividend at the rate of 10 per cent. per annum on the Preference shares, and 6 per cent. on the Ordinary shares.

—The ORION GOLD MINING COMPANY have declared a dividend of 10 per cent., payable to all shareholders registered on the 5th December. The necessary agreement for the amalgamation of the Mulders Farm by this company has been ratified.

### THE EDITOR'S LETTER BOX.

\* \* \* We wish it to be understood that we do not hold ourselves responsible for, and do not necessarily endorse, the opinions of correspondents. All communications must be accompanied by the names and addresses of the senders, though these need not necessarily be published.

### MODERN CONCENTRATING MILLS.

TO THE EDITOR OF "THE MINING JOURNAL."

SIR,—In the course of the discussion on Mr. T. A. Rickard's most able paper (on the limitations of the gold stamp mill) read at the Chicago meeting of the American Institute of Mining Engineers last year, the author remarked, "In commenting upon my description of the Gilpin County milling practice, Mr. Argall has made a series of verbal criticisms which seem to me unnecessarily hypercritical and occasionally unfair." It was, therefore, more with regret than surprise that I read Mr. Argall's letter, written from Denver, U.S.A., as I find to all appearances he has dealt with my criticism of his views upon modern concentrating mills in precisely the same spirit.

He has allowed two months to elapse before replying to me, and then when the matter has grown cold *réchauffé* it.

I quite agree with the proposition that: "The engineer who does not know enough to adapt his mill to local conditions to erect a concentrating mill that can save the mineral, and to put his mill in the best position to command alike the mine water supply and dumping ground, cannot well be expected to know even what class of mill it is necessary to build," but I venture to think that the assertion made by your correspondent in your issue of September 22, "I have long since arrived at the conclusion, based on a very wide experience, that the terrace form of mill site is not alone unnecessary, but is also undesirable for the construction of a successful concentrating mill," is so sweeping and so general that most engineers will agree with me, that, to say the least that can be said, it might bear some qualification.

If Mr. Argall is pleased to imagine that his information is so advanced that it is beyond criticism, and that he can lay down the law for this section of the profession—I mean the Britisher—speaking personally he can please himself; but speaking professionally I think he is a little "too previous" perhaps, and the style of his letters may well provoke challenge. Even a "kindergarten essay on ore dressing" would have this merit, that it would be simple and practical, which in my humble opinion is more than could be said generally of Mr. Argall's ideal typical flat-site mill, except under conditions which I pointed out in my letter published in *The Mining Journal* of September 29. If Mr. Argall chooses to consider me as an opponent, I am glad to know it; but I may tell him that my letter, which he finds fault with in his latest literary effort, was written without the slightest feeling of the kind, which he now courts.

As I am always open to correction and conviction, I thank him for endeavouring to acquaint me with my errors; but if he chooses to misread my statements I cannot argue with him. If he misunderstands them, I will endeavour to reduce them to a level which he may follow. I repeat that the advantages A and B claimed by Mr. Argall in your issue of September 22 for a flat mill site can be equally well, if not better, secured in graded mill sites; if there is not room enough for the machinery under one roof by allotting a separate building to each department, and setting these in terraces one below another. The contradiction which Mr. Argall states exists in this statement does not exist in my words, but in his imagination. In saying so, he makes a mistake, as I should have supposed the explanation I gave in the context would have made the matter plain to "the veriest tyro in ore dressing," a choice phrase I take the liberty of borrowing for the occasion from Mr. Argall.

As this point has been lost upon Mr. Argall may I re-state it:—

"To do a given amount of work you must employ a certain number of machines, which will demand an equal amount of floor room, whether your mill is flat or terraced." Mr. Argall need scarcely trouble to remind us that the object of the terraced form of mill is not to secure room for the machinery, as to secure the necessary fall from one machine to another, as the advantage of securing the automatic conveyance of the mineral downwards from one set of operations to another is precisely the reason I and others believe in graded mill sites as opposed to flat ones, and Mr. Argall has said nothing yet that I can learn, to prove that the proposition I have re-quoted for his benefit is false. If it is not false what becomes of Mr. Argall's argument? He grounds his preference for flat mill sites (a) on having abundant room round the machines, no room wasted, simplicity of lighting and heating, facility of superintendence; (b) on the crushing machinery being placed on the ground floor, dispensing with heavy framing and masonry supports, while owing to the favourable grouping of the machines, floor space and elevation are reduced to a minimum, and the expense of building retaining walls and grading terraces is saved.

Mr. Argall may be able to get more machinery of a given capacity and size into a given floor space than anybody else can, but, pending further explanation, may I point out that there is a limit to the number of machines an ordinary building will hold. In such a case, then, given a suitable site, I say that, by putting different departments in separate buildings, and setting these in terraces one below another, you can frequently secure the same room, simplicity of lighting, favourable grouping of machines, and absence of heavy grading, framing, or masonry supports as would be the case if the mill was built "on the flat;" consequently you can sometimes secure all the advantages of a flat site on a site possessing fall, if you are aware of its capabilities. Frequently, however, it may be necessary to put all the machinery under one roof, and in that case, depending on the fall that may be desirable, it will pay to raise the back of your mill and grade the ground out in steps, so as to obtain the required level for the lower floors.

The term graded mill site, I take it, covers every possible combination of these alternatives, and I use it in that sense so long as the bulk of the ore enters at a certain point, and continually descends by gravity from the point of entry. Mr. Argall may do things differently in his part of the world, but here in England we do not generally speak of falling from the ground, but are either elevated off the ground, or, with the kind aid of gravity, fall on it; but Mr. Argall thinks it necessary to say "need I again point out that in the mill built on the flat site, any desired fall can be obtained by means of elevators—between any two machines or operations." In the case of a mill built on a graded site, gravity helps the ore to fall in its descent from one stage of the process to another; in a flat mill site, as Mr. Argall points out, it has to be elevated—that is all the difference. Your correspondent's remark—"Now it is manifest that a two-story building of given length and width occupies only half the ground area of two buildings of similar size, yet Mr. Charlton would have us believe the contrary," need not be commented upon. Will he kindly give the quotation from my remarks that contained or implied any such suggestion. If Mr. Argall's idea of a flat-site mill is to build it in two or more

stories, perhaps he will also explain how the hypothetical advantages he claims for his flat-site system are carried out in practice—viz., that “the whole operation can be taken in at a glance, so the crushing machinery can be placed on the ground floor, dispensing with heavy framing and masonry support,” and as “grading” is usually cheaper than “framing, &c.” I fail to see where the cheapness of construction (in regard to the mill building) comes in. No one is likely to dispute the fact which everyone knows, that in the terraced form of mill the machines on different terraces are separated by considerable horizontal distances, but in most properly terraced mills with which I am acquainted there is no need for elevating anything but a small quantity of middle products (compared with the bulk of the crude ore crushed) which require re-treatment.

I fail in my ignorance, therefore, to see how Mr. Argall arrives at the conclusions “that the elevating done in a terraced mill is usually more than in a flat mill of similar capacity, since the two mills would necessarily be worked on entirely different systems, to suppose them worked on the same system is an absurdity. Mr. Argall says his figures remain unchallenged, but what is the good of discussing a proposition such as this seriously? Whether it is cheaper to elevate 100 tons per diem to a height of 30 feet four successive times by means of belt or cup elevators, or to let most of it descend by gravity. The broad distinction drawn between the distribution of ore from one machine to another, or from one set of operations to another, is not, as Mr. Argall terms it, by any means “hypothetical,” as the need for more or less fall in a mill of any sort is largely determined by the number of separate operations to which the ore has to be subjected.

The statement Mr. Argall next puts before us, “that in a properly constructed mill built on a flat site, by the use of elevators, each machine can be made at will superior or inferior to any other machine, to the extent of taking ore from or delivering ore to any other machine,” is certainly open to question. An elevator working at a given speed will deliver ore just as fast as it is delivered to it, so far as its capacity will admit, and the machine it feeds is liable, therefore, to be sometimes overfed and sometimes underfed. Now, most of us who have had practical experience in concentrating works know that “the duty” of the various machines varies at different times with the grade of the ore under treatment and variations in the supply available for the moment at the main crushing-floor; hence unless the speed of the elevators is reduced or accelerated, if the ore is fed from one machine to another, how can the supply be regulated at will? Will Mr. Argall name any mill containing elevators run at varying speeds so as to automatically meet the requirements of the varying capacity of the varying classes of dressing machines? And is it not true that machines that are overfed or underfed are certain to do inferior work?

The continuous automatic treatment of ore is excellent in theory, and in gold-milling, and the other cases can sometimes be carried into practical effect, but in dealing with more complicated ores (requiring concentration) it is unpractical and impracticable. Storage in bins between two operations does not violate the principles of modern concentration, and I will instance the Central Dressing Works at Freiberg as a case of one of the very newest type mills, where the operations are about as automatic as it is possible to make them, under the conditions that obtain, without sacrifice of efficiency, where storage bins are used. Having regard to the loss of efficiency and cost which arises from overfeeding or underfeeding a machine, I consider the automatic treatment of ore in certain cases can be carried too far, and it pays to employ storage bins by means of which the supply passing from one series of operations to another, given capable management, can be judiciously controlled. In reply to the question, Mr. Argall naively asks “What becomes of the gravity system of terraces if the ore has to be distributed by hydraulic or mechanical means?” This becomes of it. The bulk is conveyed through pipes or launders by water to a lower level, where it undergoes further treatment in another series of machines, and the middlings only are elevated mechanically to be re-crushed.

I do not propose to advertise my experience of European practice by comparing it with Mr. Argall's, nor to discuss which of us is the better qualified to give an opinion, but I fail to see why “tunnels” are dragged into the discussion, or how they are in any way relevant to it; and if Mr. Argall puts himself forward as a type of the new school, I certainly prefer to be classed amongst men of “ye olden time,” although we learn on his authority that “such birds are treated, even by capitalists as objects of sympathy,” &c.

As Mr. Argall states that he is not acquainted with my papers, might I enquire how he arrives at the conclusion that “the comparison made by me between the mill at Bonne Terre and in the Pyrenees is not pertinent, and the conclusions drawn are consequently incorrect. As Mr. Argall states that galena ore at Bonne Terre is crushed to pass 6-millimetre steel screens, I do not think it necessary to repeat it. In the Pyrenees it is reduced gradually to a much finer mesh (about 2 millimetres). In the former case the loss in the tailings is 27·4 per cent. of the total amount of lead in the ore; in the latter case it is a fraction of 1 per cent. Mr. Argall's instance of an American mill treats 800 tons of stuff a day at 1s. 6d. per ton; whilst the cost at the Continental works, treating less than 1-10th of the amount, is 3s. 10d. What does Mr. Argall know about works in France to warrant his statement that “the great mistake is made in comparing two mills designed to treat very different ores.” There is no such mistake made, as I was careful to point out that one mill was designed to treat galena, the other argentiferous galena and blende. In the one case, a large quantity is treated, with a corresponding large loss, in the other a small quantity is treated with practically no loss. It is so much to the credit of the Continental system that it does closer work, notwithstanding that it has to deal with a more complicated ore. I fully agree with Mr. Argall that it is commercial results we require, but it does not appear to have occurred to him that in losing 27·4 per cent. of the total lead the American works fail to save 27·4 per cent. of the total lead the ore contains, while the Himmelfahrt mill loses no lead in the tailings. Now, most practical millmen are aware of the fact that in dealing with argentiferous galena, the loss of silver is proportional to, if it does not exceed the loss of lead; if, therefore, the Freiberg ore was treated in a mill like the one at Bonne Terre, the loss, instead of being 0·01 per cent. silver, which Mr. Argall values at £240, would be about 0·06 per cent. of the silver in the ore (worth say £14·40), plus a loss of 27·4 per cent. of the total lead it contained, and not only so, but to secure these magnificent commercial results it costs 1s. 6d. per ton in America as against 10d. per ton at Freiberg, running through a far smaller quantity.

But Mr. Argall says “the Bonne Terre mill is not in any sense a typical example of American practice.” This is remarkable (as coming from Mr. Argall) since he cited it himself in his letter of September 22 as an example of an American flat-site mill. If not typical of that class of mill it is a pity he did not select a better illustration to support his theories. Whilst he seems to dislike generalities in other people he does not hesitate, I think, to indulge in a good number himself.

My next statement, which suffers distortion, was that “a complex ore like the one in the Pyrenees could be treated com-

mercially to better advantage in France, in a mill where the ore was gradually reduced and properly sized than in a mill constructed on the principles of the one at Bonne Terre, and I should have thought the figures I gave of relative saving of cost would have been sufficient to satisfy him. My critic triumphantly quotes the “Jahrbüch für das Berg u. Huttenwesen in K. Sachsen auf das Jahr, 1890,” to prove that the Freiberg mill supports his argument, and that it is built on a flat site; but if he would be good enough to refer to a paper (“Die Neue Central Aufberung Werkstätte der Grube Himmelfahrt bei Freiberg, T. S.”) by Oberbergrath O. Bilharz, he will find a section of it which shows considerable cutting, and, as Mr. Argall himself informs us, there is a total fall of 62 feet from the datum line to the highest story. If this is his idea of a flat mill (as he defines it) it is a singular one. It is built, as a matter of fact, on a slight slope, looking towards the Mulndes Valley, as I have occasion to know, from having once actually surveyed the ground on which it stands, and if more fall had been available it would certainly have been taken advantage of by its designer.

The fact that such a large amount of water has to be raised by means of pumps is one of the disadvantages of the site, and the fact that, notwithstanding this, the cost is so low only goes to prove my proposition: “The advantage of treating a complex ore in a mill built in stories or graded as compared with setting the machinery on one or two floors and elevating it mechanically from the ground to a higher level in bucket elevators.” I happen to be personally acquainted with the new Himmelfahrt mill, in which perhaps I have the advantage over Mr. Argall in speaking from knowledge of the works, and certainly “something more than reading is necessary to express an opinion” on a subject of this description. I also concur with him in thinking that “the designing and successful operating of modern concentrating mills can be safely left in the hands of those who have studied the business and carried their studies into successful practice. Most engineers with claims to practical knowledge who have written on the subject, and the catalogues of makers of mill machinery strangely enough, however, testify to the fact that they always prefer graded sites for works of the sort when they can get it! According to Mr. Argall all these gentlemen are, I gather, ignoramus? I am fully alive myself to the value of American opinion and practice, but I do not think that Mr. Argall's opinion will at present alter the laws of Nature or mechanics, nor do I believe that it represents in any sense American opinion. Oberbergrath O. Bilharz, in his observations concerning ore dressing, read at the Chicago meeting of the American Institute of Mining Engineers, at which a large number of prominent American engineers were present, took occasion to remark, “the best utilisation of suitable differences of level for the site of the works is to be studied, and the full advantage to be secured from this is in most cases so important, that it should have more weight than the simplicity of the transportation lines. Some complexity in the latter might be accepted, if necessary, to secure the greater benefit.” Quoting Rittinger he added: “The several apparatus and machines should be relatively so arranged that the middlings of each can be carried forward in the shortest and simplest way to the next following manipulation. Especially should care be taken not to let the middlings descend unnecessarily that they may not have to be hoisted again. This rule should be observed in its full scope. Intermediate elevators are to be avoided as far as possible, yet cannot be completely dispensed with even in works arranged in stories on a large scale.” No one present disputed these facts, and if they are true they show that a flat site mill is generally a construction to be avoided.

I admit, however, that under certain special circumstances a flat site mill may be the proper kind to build, viz., where saving of time in treating large quantities of ore is an object, the construction of a mill in stories is exceptionally expensive, close saving is not of primary importance, manual labour costs more than mechanical power, and the source and character of the water supply determine the choice of a site, but such cases are comparatively rare.

When criticism oversteps the line of ordinary friendly discussion one may treat it with the contempt of silence, but in exceptional cases like an exceptional ore I think it may demand exceptional treatment. I have neither time nor inclination, however, to continue argument with Mr. Argall on the lines he has chosen for himself. If, therefore, he wishes to extend the controversy further, I will submit the matter of flat or graded mill sites to a few recognised English and American authorities for an opinion, and will see that such correspondence is duly published in the mining press. If I can at any future time in any further way oblige Mr. Argall, I shall be happy to do so, if he will advise me.—I am, Sir, yours truly,

A. G. CHARLETON.

Dashwood House, E.C., December 15, 1894.

### THE VAN RYN GOLD MINES ESTATE COMPANY, LIMITED.

TO THE EDITOR OF “THE MINING JOURNAL.”

SIR,—May I be permitted, through your columns, to draw the attention of the independent shareholders of the Van Ryn Company to the way in which their directors propose to treat them, now that there is a prospect of their property turning out to be a valuable one.

The shareholders have already made heavy sacrifices under the two reconstruction schemes carried through by the South African Trust and Finance Company, original shareholders having each holding of 50 shares now reduced to but a single share!

It is now the intention of the Van Ryn directors—supported at the meeting held on the 21st inst. by the Chairman, directors, and other officials present of the South African Trust and Finance Company (although the Trust is a large holder of Van Ryn shares)—to sell nearly one-half of their valuable Mynpacht property, not even for the best price offered, and actually to allow (without disclosing the name of the beneficiaries) an option or right of call for 50,000 shares in the new (purchasing) company for no less a period than two whole years! Those who at the meeting publicly offered the higher price may have no *locus standi* to interfere, as their offer was not accepted; but shareholders as a body are in a very different position. They could, no doubt, successfully prevent effect being given to such resolutions, carried at an evidently packed meeting.

If more capital be needed to develop these claims (we have £60,000 in hand), I submit that the Van Ryn shareholders should have been allowed to raise it by the issue of new shares to themselves, at a price that would have benefited them, and so retain the whole of their valuable property.

This latest Van Ryn deal is quite on a par with the present directors of the South African Trust and Finance Company recently permitting certain parties, also unnamed (who may have known more than the shareholders), to take 50,000 Trust and Finance shares at par, with the option of 26,654 shares (the balance of the unissued capital of that company), at a small premium. Undoubtedly the shareholders should have had the

first offer of these shares, together with the information that was necessary to enable them to appreciate the advantages attached to their acquisition.

The question for shareholders to decide is whether they will fight for their rights, or submit to the dictation of the “management”—if the former, then immediate and energetic steps are necessary, but if the latter, the safest course under such treatment for the shareholders of the Van Ryn Company, and the South African Trust and Finance Company, is to allow the insiders to have all the shares of both concerns to themselves, as if these enterprises prove a success they, and not the shareholders, will reap the chief benefit by exercising their options; while, owing to the length of these options, they run little or no risk, should either company fail to realise their anticipations.—I am, &c.,

W. COTTON.  
28, Ampthill-square, London, N.W., December 28th, 1894.

## MINING IN CORNWALL

AND DEVON:  
NOTES ON MINING IN THE WEST.

(BY OUR SPECIAL CORRESPONDENT).

THE year that has closed this week has been one of the most disastrous in the annals of the industry. The price of tin has gone down steadily throughout the twelve months, and has now reached a point at which it is impossible for any but one or two mines which depend upon tin alone for their returns, to be worked at profit. A short time ago Dolcoath, East Pool, Carn Brea, and Tincoff were the leading mines of the county, all of them paying large dividends to the shareholders and considerable sums in dues to the lords. At their last meeting not a shilling was divided among the adventurers, and where a profit was shown at all it was quite infinitesimal. The only mines which paid dividends at their last meetings are Wheal Grenville, West Kitty, Killifreth, and Levant, and how many of these can be relied upon to continue making profits for any length of time in face of the continued depression in the tin market?

MATTERS have been even duller in the mining world than is usual in Christmas week, and the season which is usually known as “festive” has been a melancholy one indeed in the western mining districts. There is as yet no sign of a rift in the heavy clouds, and though hope has by no means been abandoned by the great body of adventurers, who are nothing if not sanguine, signs are multiplying that some of the largest shareholders are tiring of the continual drain upon them, and will not stand it very much longer.

NEVER, surely, was there a more unpromising time for new ventures, yet it is stated that a syndicate has been privately formed from among the old shareholders of the Prince of Wales Mine, near Calstock, to search for the missing lode. Messrs. Henderson and Sons, of Truro the well-known mine surveyors, have been instructed to make a complete survey and plan of the shafts and levels from the 155 to the 193, which latter is the bottom of the mine. The mine and machinery were purchased some weeks ago from the liquidator of the old company for £600. The capital of the syndicate is £5000, and the first issue of £2000 has been fully subscribed.

At Dolcoath meeting on Thursday the shareholders had once more to forego their dividend, and worse than that had, when the lord's dues had been deducted, to face a small loss, though not sufficient to make it necessary to make a call. The returns of tin were 493 tons, but this comparatively small quantity was explained by a resolution of the committee passed in November instructing Captain Josiah Thomas to raise just sufficient tin to meet costs. The wisdom of such a course is a matter of opinion, but it may be taken for granted that the shareholders concurred in the desirability of it, since it was left unquestioned, and it may be further assumed that Dolcoath will continue to raise just sufficient for the purpose of meeting costs until the price of mineral shows some signs of improving. The action of Mr. Bassett, the lord of Tehidy, came in for a good deal of criticism. An application was made to him by the committee for a remission of dues in view of the disastrous condition of mining generally, and its effect on Dolcoath particularly. They were, however, met with a point blank refusal, and after paying Mr. Bassett £1075 for dues, the quarter's working showed a deficiency of £189, though that is just covered by the balance in hand. It would have been a very gracious act on the part of the lord to have foregone at least a portion of the dues.

DEVON GREAT CONSOLS COMPANY celebrated their jubilee last Saturday in a very interesting manner. The distribution of 250 guineas amongst the employees was to them, naturally, at this season of the year, most acceptable. This ceremony took place at the mine, Mr. Peter Watson, the Chairman of the company, and Mr. Glenn, one of the directors, coming down to superintend the disposal of the money. Previous to the distribution Mr. Watson addressed the men from the “settling box,” on behalf of the directors and shareholders of the company—who, it will be remembered, voted 200 guineas at the last meeting. His Grace the Duke of Bedford, handsomely adding 50 guineas more—and expressed his approval of their conduct. After the men had been paid, the directors and leading officials, with a few friends, dined together in the account house, under the presidency of Mr. Watson, Mr. Bawden occupying the vice-chair.

THE loss at South Frances on the quarter just over is no less than £2283, and the adverse balance £3349, which a 10s. call does not quite cover. South Frances is a very expensive mine to work, the costs averaging about £10,000 a quarter. The merchants' bills for November are not charged, so that the financial position of the mine is even worse than appears from the statement of accounts. On the face of it so far the hopeful anticipations which were indulged in at the time of the amalgamation with West Bassett have not been justified in the least degree.

THE whole of the machinery on the Phoenix and West Phoenix Mines, near Liskeard, is advertised for sale. These mines have been very rich in their day, no less than £1,300,000 worth of ore having been sold from them. The stopping of the mines will be severely felt in the district, but it is much to be feared that this is what will happen.

—The EXPLORING COMPANY is now able to announce that the general meeting of the shareholders will be held at Cannon Street Hotel, on Friday, the 11th January, 1895, at 12 o'clock.

WHITTAKER'S ALMANACK.—We have to acknowledge receipt of this celebrated Almanack for the year 1895. As usual, it is brimful of interesting and important information, and sustains its reputation as the greatest of its kind published.

**C. PASS & SON (Limited), BRISTOL,**  
AND BUYERS OF  
LEAD ASHES, SULPHATE OF LEAD, LEAD SLAGS,  
ANTIMONIAL LEAD, COPPER MATTE, TIN ASHES, &c.  
and DROSS or ORES containing  
TIN, COPPER, LEAD, AND ANTIMONY.

**HENRY WIGGIN & CO. (Limited),  
NICKEL AND COBALT REFINERS,  
MAKERS OF BEST RED LEAD FOR FLINT GLASS  
MANUFACTURERS,  
BIRMINGHAM.**

**PACIFIC MINING AGENCY AND TRUST COMPANY.**

A Corporation organised under the Laws of the State of California.  
CAPITAL STOCK, £50,000.  
BOARD.

IRWIN C. STUMP (Chairman) Manager of the Estate of the late U.S. Senator Hearst.  
IRVING M. SCOTT, Manager Union Iron Works.  
JACOB H. NEFF, President California Miners' Association.  
P. N. LILIENTHAL, Manager Anglo-California Bank (Limited).  
W. F. GOAD, Vice-President, Wells, Fargo, and Co.  
D. M. BURNS, Capitalist.  
R. C. CHAMBERS, Manager Ontario Mine, Utah.  
WILLIAM C. RALSTON, Secretary (Secretary California Miners' Association).

BANKERS—The ANGLO-CALIFORNIAN BANK (Limited).  
HEAD OFFICE—MILLS BUILDING, SAN FRANCISCO, CAL.

**THIS COMPANY** sells Mines, Mining Claims, Ditch Properties, and Water Rights ON COMMISSION, and will act as Agent and Broker for the Sale and Purchase of such Properties.

It is intended to conduct the Purchase and Sale of Mining Claims, Ditch Properties, and Water Rights on the same basis as a real estate transaction.

The Company is prohibited by its Articles of Incorporation from buying or selling on its own behalf, or except upon commission, or as agent or factor for others.

The buyer pays no fees whatever, and there is no incentive to advance the price beyond the original figures at which the price and commission have been agreed upon with the seller.

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LONDON: DECEMBER 29, 1894.

### PROGRESS IN MINING.

THE end of the year is perhaps the most fitting of all times on which to look backwards and examine whether the events of the past twelve months have been of a progressive or of a retrograde nature. In mining and its associated industries, to the welfare of which *The Mining Journal* is expressly devoted, we can, on the whole, congratulate ourselves upon the advance which has been made not only in exploration and development of new fields of labour as in Western Australia and South Africa, but also in the application and extension of improved scientific processes to the extraction of the precious metals from the gangue containing them. Year by year some small, and at the moment apparently trifling, modifications of old processes or entirely new applications of scientific principles are introduced which, as they are enlarged and developed in actual practice, entirely change the aspect and conduct of mining matters, and finally end in supplanting manual by mechanical labour and rule of thumb methods by processes of scientific precision and chemical formula. Not a few of us can look back to the time when rock drills were in their infancy, for example, and yet, now-a-days, no mine of importance is worked without their aid. Modern explosives also have largely taken the place of the old black

powder, and we can well remember how difficult it was to overcome the prejudice of miners, and induce them to give dynamite a fair trial, and yet many mining operations could not well be undertaken in these days if gunpowder were the only explosive available. Then, again, the loss of time which would be entailed if a rock drill had to be removed, for the firing of each separate hole almost necessitated the boring of a large number of holes at the same time in the face of a tunnel, and in order to prevent the spoiling of one hole by the blasting of another, means were sought for causing the explosion of the whole series simultaneously. This end can be effected by certain arrangements of the fuse, it is true, but by far and away the most efficacious manner is to use electric fuses and so ensure the blasting of the whole number at precisely the same moment, and as a consequence the obtaining of the most efficacious result from the quantity of explosive used. We have used this method in quarrying with most favourable results, and the sight of the explosion of a series of, say, 50 holes is not to be readily forgotten. Electric firing was perhaps the first introduction of electricity into mining matters, but now its uses for lighting and motive power have so rapidly extended that most mines employ it in one form or another, and as we have pointed out in our recent leaders on the subject, it can be most advantageously employed as a motive power for almost the whole of the machinery used in mining.

Then, again, in pumping machinery there has been a most marked change in recent years. At one time the Cornish pumping engine, with its ponderous rods, balance beams, angle beams, and various complications, was practically the only type of engine used for the drainage of deep mines. Now, however, this engine has apparently had its day; and although they are a marvel of skill and a lasting tribute to the brilliant engineers who designed them, and to the workmen who in those early days of mechanical engineering were able to manufacture them, yet in these more modern times they are being superseded by the introduction of duplex, compound, condensing, and high duty pumps, which are not only more efficient, but also less liable to accident; and being erected in duplicate at the bottom of the shaft, have abolished the rigid mass of reciprocating rods which were an essential feature of the Cornish engine, the breakage of one of which usually entailed the construction of a new engine. Turning from underground appliances to those used in milling operations on the surface, we again see a most marked change. We can remember how the rock as it arrived at the mill was first of all smashed up by hammers before being sent to the stamps or crushers. Now every mine has its rock breaker of the well-known BLAKE type, which will do more work in an hour than a dozen men would do in a day by the old method. The BLAKE in its turn has been improved upon for certain purposes, and instead of having only one moveable jaw is constructed with several, and has also to compete with the GATES breaker, a most efficient machine for certain classes of ore. The old well-known Cornish rolls have also suffered changes, and are no longer constructed with the heavy weighted levers which were a familiar feature at one time, and which have been replaced by rubber or spring buffers, and in their most perfect form are represented by the KROM rolls. The process of crushing itself has been brought within more scientific lines by the introduction of modern concentrating machines, inasmuch as it is recognised that what is needed is not to smash up the ore to powder, but only to crush it so far as it is necessary to do so in order to liberate the mineral particles from the gangue, and above all to avoid the making of fine powdery ore, which later on becomes, in the form of slimes or pulp, most difficult to handle successfully. The introduction of the well-known cyanide process has helped to enforce this doctrine, for what is needed in this connection is sharp, crisp sand through which the solvent can percolate freely, and not fine slimes, which form compact and almost impermeable mud in the vats.

From crushing to pulverising machinery is an easy step, and we are at once brought in contact with almost numberless machines which have been invented of recent years for the purpose of pulverising the ore, few of which have successfully achieved the object in view, and fewer still have come into actual practice. Stamp batteries have been much improved in detail and in the material of which they are constructed, and as an all-round, serviceable machine they are a long way ahead of their competitors. Roller mills, such as the HUNTINGTON, have been introduced and worked with good results with certain ores, and so also have certain types of Ball mills, but for large permanent plants treating enormous quantities of ore per day the stamp battery is certainly the one most in favour with the modern engineer. Classification, which is the key to success in concentrating mills, but which was almost unknown, or if known was neglected and despised within our own memory, has been brought more and more to perfection, and as a result the modern jigger can effect the separation of ores which formerly were thrown aside as unworkable. The jigger itself has been evolved from the hand sieve worked in a tub of water, and which we have seen in use in Wales, and has developed into an almost perfect and automatic machine for the purpose of coarse concentration, for which it is practically the only appliance in use. The mind of the inventor has indeed been fertile in the production of various forms of bubbles for fine concentration, some of which, but very few, have been adopted, and perhaps the most perfect form of bubble is the well-known LINKENBACH table, which, though occupying considerable space, is yet very efficacious and economic in doing its work. So, too, with fine concentrators of the belt type which originated in the BRUNTON Cloth, the number of inventions has been legion, but in practice we have only the end delivery belt typified by the FRUIT vanner, and the side delivery known as the LUHRIG vanner. The former being used for the separation of one mineral from its gangue, while the latter is capable of concentrating two minerals at the same

time, as for instance, galena and blende. As prime movers for mining machinery, we have water, steam, and electricity, in the two former of which many modifications and improvements have been made, while the latter is a comparatively new importation into mining, but is one which has already made gigantic strides. The old fashioned water wheel, cumbrous in itself and slow in its movements, has given place to the compact Turbine and Pelton wheel to which we have referred in recent leading articles.

The steam engine has undergone many modifications, notably by the introduction of compounding in the engine itself and by improvements in the boiler, which have resulted in the obtaining of a higher efficiency with the expenditure of a less amount of coal, a most important matter where fuel is scarce and valuable. We have so recently and fully referred to the introduction and use of electricity as a motive power, that beyond pointing it out as one of the greatest signs of progress, of which we are justly proud, we do not intend to refer to it in detail. Nor indeed does space permit us to do more than mention the advances made in the all important item of transport, not only by the extension of full sized and narrow gauged light railways, but also by the introduction of the aerial or rope railway system which has brought hitherto inaccessible mines within the reach of railway terminus or a shipping port. Our Schools of Mines are yearly turning out numbers of men more and more fitted for the important duties they will have to perform and the positions they will be called upon to hold, while men long skilled as engineers are publishing their experiences in the form of technical mining literature for the benefit of other members of their profession, so that in the short survey we have made of the past, we see much upon which to congratulate ourselves and our readers, and much which should encourage us all to push vigorously forward in the future towards securing the "precious things of the everlasting hills."

## NEW ENTERPRISES IN GOLD MINING.

**I**T is easy to point out indications that the year upon which we are about to enter will see a distinct revival in many branches of mining enterprise. The investing public have so far overcome its distrust of mining ventures that it is ready to give plenty of support to undertakings that offer a serious guarantee of economical management. The success of gold mining is no longer based upon the existence of rich reefs of quartz, or of an exceptionally heavy percentage of metal in placer deposits. A very small content of gold will suffice to ensure a certain profit to concerns working the ore by means of the cyanide and other processes now open to them, and a large and prosperous industry has rapidly grown up in the Transvaal upon the ruins of the numerous concerns whose rash speculation a few years ago made gold mining a by-word and a reproach. Fortunately, the experience of those failures has taught company directors the wisdom of carrying on operations in a systematic and business-like manner, and the economy which has thus been effected during the past year has raised public confidence in the Rand to a point from which it is not to be easily shaken. The immediate result of this popularity of gold mining is certain to be an extension of public interest in new ventures outside the narrow limits of the Transvaal. The Rand mines are now in the hands of enormous financial bodies who have practically monopolised the whole industry, and offer very little scope for legitimate speculation to the ordinary investor. It is, no doubt, an advantage to the vast majority of the public to know that it can place money in undertakings without running any risk of losing it, but, having to pay for this absence of risk in a smaller percentage of dividend, many investors would prefer to strike out in a new direction, and take part in enterprises of which the proved results have not as yet advanced shares to a level inconsistent with profitable speculation. It is, indeed, surprising that the interest now being shown in the Transvaal mines has not been taken advantage of by the company promoter in floating more new concerns than have made their appearance upon the market during the past year. This is in itself a favourable indication of the more healthy tone of mining speculation, and shows that the public is less credulous nowadays of the immense fortunes to be made in the working of hitherto unknown auriferous deposits. In fact, it seems as if the business of the promoter who floats a company with the sole idea of making a profit at the expense of the shareholders is pretty well played out, or at least the fierce light of criticism which beats upon suspicious undertakings is so efficacious that they are rarely able to survive beyond the preliminary stages of formation. Capitalists, too, are themselves taking to prospective work instead of buying up claims at the sellers' estimate, naturally at a very exorbitant figure. This is the only way in which the gold mining industry can be expected to increase in activity without sustaining those temporary checks which in the past have done much to retard its growth. There is, indeed, no class of investors more susceptible to panic and suspicion than those who dabble in gold mining scrip, and it is very desirable that nothing should be done to compromise in any way the feeling of confidence which seems to be settling down upon the mining market. It speaks well for the excellent tone of gold mining that the West Australian boom should have been allowed to pass over without attracting too much public money upon the strength of merely prospective results. Investors are quite content to wait before venturing their capital in the working of properties of which the value can at the best be only imperfectly known, and if the mines prove to fulfil expectations there will be no lack of capital for carrying out operations upon a sufficiently extensive scale. The newly discovered mines are undoubtedly rich and capable of considerable development, but in view of the past experience of the Transvaal it is very desirable that the new companies should proceed systematically instead of commencing operations upon the faith of enormous and speedy returns. A

mine may be rich enough to yield large profits under whatever conditions it may be worked, but these profits will be still further increased by employing the latest methods of economically treating the quartz, and no company can be considered to have any definite chance of success unless it seek to extract the greatest quantity of metal at the lowest possible cost. No doubt, if these methods are adopted, the development of the West Australian mines will be one of the features of the coming year. At the same time, they are not likely to share with the Transvaal the honour of entirely monopolising the attention of the investing public, for the possibility of making a profit out of mines carrying only a small content of gold is leading to an extension of enterprise elsewhere. The success of the prospecting operations that have been carried on in Mashonaland has revived public confidence in the auriferous possibilities of this new acquisition to the British territory, and if the faith of those capitalists interested in the mining future of the country proves to be only partly justified a fair amount of capital ought to be forthcoming for the working of its mineral resources. The same tendency to enlarge the area of operations is also noticeable on the Continent, where the investor has found himself so far tributary to British enterprise, and the poor results to be secured from taking up scrip that has been off-loaded on to the foreign Bourses have awakened capitalists to the necessity of showing a little initiative in striking out in a new direction. Some attention is consequently being given to the gold mines in North America, while the highest opinions are expressed by French capitalists of the value of the newly-discovered auriferous territory in Siam. Yet, in spite of the confidence that is being shown in the future of the industry, investors refuse to blindly take part in new undertakings unless they are assured that the management of the concerns will be conducted upon strictly economical lines. For this reason there is abundant hope that gold mining will continue to meet with a great deal of support at the hands of the investing public, and it is quite possible that the stimulus thus given to judicious speculation will have a favourable influence upon other of the mining branches that have unfortunately lingered for a long time past under a cloud of depression. The condition of the metal market is certainly far from giving promise of an early renewed activity in metalliferous mining generally, but a gleam of comfort is justified by the fact that the demand for some of the metals is perceptibly larger now than it has been for several months. The movement, it is to be feared, cannot be considered as anything but a temporary one; but the fact that it has taken place would show that the condition of the market is not quite so bad as it seems, and that it is ready to respond to any industrial activity that may be stimulated by the growing production of the precious metal.

## NOTES AND COMMENTS.

**M**R. McDERMOTT'S paper on "Mining Reports and Mine Salting" might, without any violation of accuracy, have been previously announced as a humorous contribution to the annals of the Institution of Mining and Metallurgy. His comparison in point of magnitude of the prophetic calculations figuring in the average mining report with the approximate calculations of star distance, his depreciation of an unsparing introduction of the nebular hypothesis into geological descriptions of mining districts, and his pointed references to the ubiquity of the true fissure vein, taken together, are sufficient to redeem the Institution from any accusation of a Celtic want of the humorous faculty. There was, however, as all were inclined to admit, an almost grimly serious phase of the subject. Behind the genial witticisms with which the ably-written papers abounded was visible a full appreciation of the iniquities of dishonest company promotion and their deplorable results, first on the unhappy investors, and then by a sort of reflex movement on the industry itself. In fact, it might easily be that the practical recognition by the author of the undoubted fact that in a way "the half is better than the whole" may have been instrumental in carrying home to his hearers with a double force the entire iniquity of the mine-salter. The vivid reminiscences of personal contact with this species of impostor which must have recurred vividly to the minds of many of the members lent, no doubt, an additional weight to the periods in which his dealings were exposed.

By his authorship of this paper Mr. McDermott has rendered a service to every branch of the mining community. A timely word to a young professional man may easily be productive of the most beneficial results. It is the custom with the representative councils of the serious professions—generally with a well-known lecturer as spokesman—to convey periodical doses of fatherly advice to the students upon the outset of their career which, while they are eminently useful, are not unpalatable. Just such a purpose as this would be admirably and pleasantly performed by Mr. McDermott's paper were it circulated among the mining students on the point of leaving South Kensington. Not that it would cover all the ground—such was not the purpose of the author—but it would set pretty legible warnings upon many a pit-fall set for the unwary neophyte. The accumulated experience of the members of the Institution contributed to the debate, and embodied in the next issue of the transactions, will shed a blaze of light upon the trickeries and ingenuity of the dishonest mine-vendor. There was wanting this page in the criminal literature of the day, and an unusual interest attaches to it since it reflects methods transcending those of the vulgar purloiner.

MINING circles have not altogether escaped the influence of the wave of prophecy which is now passing over the globe. Socialists are not to be allowed a monopoly of writing history

by anticipation. Mr. W. D. Bishop, an American mining engineer, speaking at a recent banquet held in connection with the American Association of Mining Engineers, read a forecast of a mining prospectus dated January 1, 1894. The proposal embodied in the document was one that might fairly be classed with the group of hare-brained schemes known as the South Sea Bubble. An antiquarian, wandering mournfully among the ruins of a decayed civilisation, lights upon the tomb of a Vanderbilt or a Gould. Recalling to memory the customs of a people who lived in the dawn of civilisation, he is struck with the recollection that they used gold-stopping for their teeth, and the dollar, or its counterpart, being as influential and potent then as now, he conceives the idea of systematically working the coffins of the departed. Hence the prospectus of the year of grace, 1894. It was carrying the idea to the ultimate conclusion as a sound commercial proposition by instituting a system of free insurance for the shareholders in the new company.

More than one apparently well-informed writer upon industrial matters has seen in Mashonaland a future mining district of the greatest importance, and, as already we have had occasion more than once to note, it is opening up with almost unexampled rapidity. Salisbury, the seat of government; Umtali, a mining camp, at present rather thickly populated; and Fort Victoria, are three towns which bear every indication of becoming important commercial centres. If report speaks truly, moreover, the local conditions are such as to favour the growth of mining enterprise. With the completion of the Beira Railway the present difficulties of transport will be largely mitigated, while the erection already of two five stamp batteries in the vicinity of Victoria suffices to show that, under present conditions, there is nothing insuperably difficult about the introduction of machinery of a fairly heavy type. During the year to be commenced next week importations upon a much larger scale are expected to be carried out, so that before long the mining capabilities of the district will be thoroughly tested. Very favourable geological reports have been furnished as to the mineral resources of the five gold fields of the country. They have yet to be justified by returns.

"CONGRESS will discuss," says *El Imparcial*, "the proposed law, the object of which is to lighten the heavy burdens under which lead mining now labours, and which has brought it into a most seriously critical condition. Although this subject is far less picturesque than our political debates, yet it is of vital importance to thousands of families, whose very existence is in imminent peril. We, therefore, venture to think that the Cortes will treat it with all the attention it merits. A very few facts will suffice to show at a glance what the difficulties are that the industry of lead mining has to contend with. The latest market prices in Cartagena were as follows:—10 pesetas per quintal of lead (£7 17s. 6d. per ton) and 3 pesetas 25 centimos (2s. 4d.) per ounce of silver, these being the lowest ever realised. When the quintal of lead was worth 15 or even 20 pesetas and silver 4·50 to 5 pesetas an ounce, mining paid no taxes beyond the ordinary surface dues as by law established and 1 per cent. of the gross output. To-day, at the very time when prices have fallen to the extent already indicated, Government has increased the taxes on mining as follows: Instead of 1 per cent. on the value of the gross output, 2 per cent. is now exacted, whilst the surface dues have been increased by 30 per cent., besides which lead and argentiferous galena pay an export duty of 10 pesetas per ton. On all explosives, and more particularly on dynamite, that all-important element in mining operations, a duty of 1 peseta per kilogramme has been imposed. And as though all these heavy charges upon a single industry were not sufficient, the duty upon coal has also been increased.

"THIS is the cause of the ruin that has overwhelmed the lead mining regions of the Iberian Peninsula. It will be sufficient to say that within the space of one year, and in the province of Murcia alone, 699 mining concessions have been allowed to lapse. The smelting works, which the present crisis has found badly prepared to meet it, have either closed down or have failed completely. Even the few, which being well provided with funds, have been able to keep going, have been compelled to dismiss two-thirds of their hands. If the present state of affairs lasts until January even those few workmen who still have work will find themselves deprived of it." To this we may add that, whilst the above article refers to lead mining alone, the whole of the Spanish mining industry generally, and notably iron mining, in which English capital is largely interested, are feeling the effects of the above iniquitous charges. Although numerous mining concessions were granted in perpetuity in accordance with the law decreed on the 29th December, 1868, and confirmed July 25th, 1883, subject to the payment of surface dues at the rate of 10 pesetas per hectare for metalliferous mines, with the exception of iron ores, which pay only 4 pesetas per hectare; yet the Government have arbitrarily raised these dues by 30 per cent. as recently as August, 1892, at which said date the royalty of 1 per cent. on the gross value of all minerals raised, which was imposed in 1883, was doubled at one stroke. Practical iron miners will be able to estimate the increase in cost of iron ore due to the levying of a duty of one peseta per kilogramme (say 4d. per lb.) on dynamite, this corresponding to an increase of some 30 per cent. of the cost of this indispensable article. Seeing how low the price of iron ore is at the present day, and how keen the competition from all parts of the world, it is pretty obvious that these enormous taxes must seriously endanger, if not entirely destroy, one of the main sources of the wealth of Spain.

A NOVELTY in connection with the tin-plate trade is reported from America, which may lead to the serious retarding of certain Trades Unionist movements in connection with that and other industries. The position is as follows: The Amal-

gated Association of Iron and Steel Workers have just filed a petition in the American Law Courts for an injunction against the United States Tin-plate Company and the Association of American Tin-plate Manufacturers. In their petition they say that in July last the parties to the suit entered into an agreement upon a scale of wages to be paid for one year, and that the United States Company disregarded this agreement and started its mill at Demmler at lower rates of wages than were specified in the contract. The Court has been asked to grant an injunction restraining the United States Company from working its mills at Demmler. A hearing has not yet been held, but the result will be awaited with interest not by Trades Unionists alone, nor only by tin-plate manufacturers, but also by tin mine shareholders.

Quite "a gold mine in tin"—if such a phrase is justifiable—has been secured by the Pittsburg and Mexican Tin Mining Company, in the State of Durango, Mexico. The operations of this concern are causing a good deal of comment among tin mining shareholders and others on both sides of the Atlantic just now, and well they may. Additional mines have lately been opened, and the latest position is that the concern has, in all, 64 mines, and prospects which have been tested to a depth of from 20 to 40 feet, and all show great richness of veins. It is stated that the entire property is so underlaid with tin ore as to justify the most extravagant claims as to the property's future. The tin, which is said to be of excellent quality, is taken to New York by vessels where it is sold at the same price as tin of the same grade from the Straits. The concern's capacity of treatment is at present 64 tons of ore daily, which means a production of about 3 tons of metallic tin per day; but it is stated that the production will soon be increased to 80 tons of ore, or 4 tons of metallic tin.

## OUR CITY ARTICLE.

FRIDAY EVENING.

### THE MINING MARKET.

An enormous carry-over.—Rand shares booming.—West Australian pick up slightly.—Markets brisk at the finish.

A BOOM in South African shares has been the chief feature of this week. The fact that Monday preceded Christmas day did not tend in any way to decrease the amount of business transacted in the Mining Market. There was great activity throughout the day, and buying was brisk even as late as six o'clock on Christmas Eve. Clerks were busily engaged completing their arrangements for the carry-over, which was of enormous dimensions. Rates were fairly heavy. Chartered were at one time done at 2½, and Gold Fields at 4d. Among the most noticeable of the rises were those in Simmer and Jack, Modderfontein, Rand Mines, Nourse Deep, City and Suburban, Consolidated Gold Fields, Ferreira, Village Main Reef, and Orion. Noticeable among the shares which declined were De Beers, Jumpers, and Clever Estate. A fair amount of business for the new account was done in East Rand and Johannesburg Investment. West Australians, too, were fairly buoyant. No break occurred on Thursday in the animation characterising the South African Market. Orders from all parts of the Kingdom arrived in great blocks, with which the dealers found the greatest difficulty in coping. It is almost impossible to particularise any section as having been especially brisk and buoyant. All over the Gold and Land sections there was great activity, and the vast majority of the changes were in favourable directions. The improvement was reflected in the West Australian Market, where a better state of things prevailed than for some time past.

#### British Mines.

At Dolcoath meeting the turns for 12 weeks were 494 tons, and cash £18,640 17s. 10d. The committee applied to the lord for a reduction of the dues, but Mr. Goddard replied saying that no reduction could be made. After charging £1075 0s. 11d. dues for Mr. Bassett, there was a loss of £189 10s. 3d. in the 12 weeks. Some of the adventurers thought that, under all the circumstances, the lord should have made some abatement, and so shared in the prevailing depression, but in all the mines on the Tehidy estate except Carn Brea and Dolcoath no dues worth mentioning are now being paid, for the simple reason that calls are being made. Captain Josiah Thomas presented a very encouraging report of the mine, and stated that a much larger quantity of tin could be returned, but, with tin under £40, the committee did not consider it prudent to return more tin than would be required to meet expenses. The mine is being rapidly developed, and far more tin is being discovered than they are now returning.

#### South African Shares.

The settlement in a fair way of completion, an active bidding commenced for the new account. In the South African Market Buffelsdoorn, on Cape buying, gained 12s. 3d. to 24s., while Gedenhuis Estate and Wemmer hardened ½ to 5½ and 6½ respectively. Ferreira, New Rietfontein, Crossus, Glencairn, Gold Fields of Mashonaland, and United Langlaagte closed ½ better, an improvement of ½ taking place in Henry Nourse, Jumpers, Meyer and Charlton, Village Main Reef, United Roodepoort, and Africander. Gains of ½ were recorded in City and Suburban, Heriot, New Primrose, George and May, Knight, George Goch, Kimberley-Roodepoort, May Consolidated, Wolhuter, Worcester, and Van Ryn. Among deep level shares Nourse Deep climbed up ½ to 5½, Gedenhuis Deep ½ to 7½, East Rand 4s. 6d. to 50s. 6d., Gold Fields Deep 6-32 to 4, and Roodepoort Deep ½ to 2½. In the Land department Chartered were exceptionally firm at 45s., while Oceana, Exploration and Transvaal Gold Fields gained ½. Diamond shares were very buoyant, De Beers rising ½, and Jagers, ½, to 18s. 6d. and 17s. 6d. respectively. The South African Market continued buoyant and strong throughout Thursday, rises occurring all over the department. Rand Mines gained ½ to 22s. Rises varying from 10s. to 15s. occurred in Nigel at 6s., Gedenhuis Estate at 6s., and Jubilee at 8s., while Buffelsdoorn improved ½. Crown Reef hardened to 10s., Durban-Roodepoort to 7½, and Bantjes to 2½. Henry Nourse rose ½ to 54s., and Jumpers left off at 6s. or ½ up. A rise of ½ also occurred in Champ d'Or at 4s., in George Goch at 2½, in Modderfontein at 10s., in Salisbury at 3½, and in Wolhuter at 5½. May Consolidated were up to 4s., Langlaagte Royal to 5½, New

Primrose to 6, and Spes Bona to 27s. Ferreira and Wemmer on profit-taking relapsed ½ to 15s. and 6½ respectively, while Langlaagte, Meyer and Charlton, Robinson, and Simmer and Jack lost to a trifling extent. Rallies, on the other hand, occurred in City and Suburban, Consolidated Deep, Kleinfontein, Knight, New Rietfontein, New Chimes, Stanhope, Village Main Reef, and Worcester. In the Land section Oceans were strong, closing at 2½. Chartered closed higher on the day at 46s. 9d., while Bechs, Transvaal Development, Transvaal Gold Fields, South African Gold Trust, South African Trust and Finance, Potchefstroom, Johannesburg Trams, Balkis-Eersteling, and African Consolidated were largely in demand at higher figures. The market opened firm this morning, but later on became rather flat, the movement being as general as the strengthening of the preceding day. There was some disposition to recover before the close, but the ground lost in the morning was not wholly recovered. The humours of the market were too general to admit of particularisation.

Risen : Africander, 7s. 6d.; Aurora West, 6d.; Balkis Eerste-ling, 1s. 6d.; Balkis Lands, 6d.; Bantjes, 20s.; Bechs, 3s.; Block B, 6d.; Buffelsdoorn, 23s.; Champ d'Or, 8s. 9d.; Champ d'Or Deep, 1s.; Chartered, 5s.; Clever, 3s. 9d.; Consolidated Gold Fields, 2s. 6d.; City and Suburban, 2s. 6d.; Crown, 5s.; De Beers, 12s. 6d.; Durban, 10s.; Eastleigh, 1s. 3d.; East Rand, 5s. 6d.; Exploring, 15s.; Ferreira, 7s. 6d.; Frank Johnson, 1s. 3d.; Gedenhuis Estate, 25s.; Gedenhuis Main, 1s. 6d.; George Goch, 7s. 6d.; ditto and May, 5s.; Ginsberg, 6s. 6d.; Gold Fields of Mashonaland, 5s.; Glencairn, 7s. 6d.; Grahamstown, 6d.; Graskop, 3s.; Harmony Preference, 1s. 6d.; Henry Nourse, 12s. 6d.; Heriot, 7s. 6d.; Johannesburg Investment, 6s. 3d.; Johannesburg Trams, 6d.; Johannesburg Water, 8d.; Jubilee, 25s.; Jumpers, 10s.; Kleinfontein, 7s. 6d.; Klerkedorp, 2s.; Langlaagte Royal, 7s. 6d.; Main Reef, 6d.; May, 5s.; Metropolitan, 2s. 6d.; Meyer and Charlton, 2s. 6d.; Modderfontein, 22s. 6d.; Moodie's, 1s.; Mozambique, 1s.; New Belgium, 6d.; New Chimes, 2s. 6d.; New Cresus, 6s. 3d.; New Jagers, 5s.; New Louis d'Or, 3s.; New Primrose, 7s. 6d.; Nigel, 25s.; Nourse Deep, 7s. 6d.; Oceana Development, 6s. 3d.; Oceans Lands, 3s. 9d.; Ophir, 6d.; Ottos, 1s.; Paarl, 6s.; Potchefstroom, 6d.; Princess, 12s. 6d.; Randfontein, 1s. 6d.; Rand Mines, 55s.; Read's Drift, 1s. 3d.; Rietfontein, 5s.; Roodepoort Kimberley, 2s. 6d.; Roodepoort Deep, 2s. 6d.; Salisbury, 5s.; Sheba, 1s.; Simmer, 37s. 6d.; South African Gold Trust, 11s. 3d.; ditto Finance, 1s. 6d.; Spes Bona, 3s. 6d.; Stanhope, 5s.; Sutherland Reef, 1s. 6d.; Transvaal Coal, 1s.; United Langlaagte, 2s. 6d.; United Roodepoort, 5s.; Village, 2s. 6d.; Wemmer, 7s. 6d.; Witwatersrand Knight's, 5s.; Wolhuter, 7s. 6d.; Worcester, 7s. 6d.; Zambesia, 2s. 6d.—Fallen : Barrett, 3d.; Consolidated Deep, 1s. 3d.; Gedenhuis Southern, 1s.; Johannesburg Estates, 1s.; Lionsdale, 1s.; New Transvaal Land, 6d.; Robinsen, 2s. 6d.; Spitzkop, 1s.

#### Miscellaneous Shares.

West Australians were lively on Monday. West Australian Gold Fields rose ½ and White Feather ½. Hampton Plains, Mount Morgan, and Bayley's Reward were each ½ higher. Broken Hill Proprietary and Australasian Mining hardening the turn. There was a small boom among Indian shares. Nundydroog and Oregum rose ½. Mysore Wynnaid 9d., and Mysore Gold Fields, Balaghat, and Nine Reefs (partly paid) 6d., while Kempinkote and Nine Reefs were slightly better. Among copper shares Cape Copper advanced ½ to 1½, and Rio Tinto gained a further ½ to 15½. Something of the boom in the South African Market spread itself in the West Australian section on Thursday, where there was distinctly greater strength preponderant. West Australian Gold Fields hardened to 3½, Hampton Plains leaving off at 1½ and London and West Australian Exploration having risen at 1½, while Great Boulder (fully paid) at 15s. bid and Bayley's Reward at 17s. were each a shade harder. Blackett's lost ½ to 5. Elsewhere Champion Reef gained ½ to 3½, and Oregum Pref. were better at 3½. St. John del Rey hardened to 28s. 6d., and Kapanga and Jay Hawk to 4s. 9d. and 3s. 9d.

Business to-day in West Australians has been rather limited, but on the whole the tendency was upward, and an opinion widely prevails that a recovery in this section is only a question of time. In the Indian market Mysore Gold Fields have been steady, but the rest of the shares flat—more especially Nine Reefs.

Risen : Argentine Concession, 3d.; Australasian, 3d.; Baker's Creek, 2s. 6d.; Brilliant (allowing for dividend), 2s. 6d.; Brilliant Block (allowing for dividend), 1s. 9d.; British Broken Hill, 6d.; Burma Ruby, 2s. 6d.; Callao Bis, 9d.; Caratal, 3d.; Carrington, 9d.; Champion Reef, 2s. 6d.; Cumberland, 3d.; Emma, 3d.; Holcomb Valley, 4d.; Kaboonga, 3d.; Kapanga, 1s. 6d.; Macate, 3d.; Mills Day Dawn, 1s. 3d.; Mount Morgan, 2s. 6d.; Mysore, 1s. 3d.; Nundydroog, 1s. 3d.; Oregum, 1s. 3d.; Oregum Preference, 2s. 6d.; Orita, 3d.; Rio Tinto, 2s. 6d.; St. John del Rey, 1s.; Waihi, 35s.; Wentworth Ordinary, 6d.; Faller: Balaghat, 6d.; Broken Hill Proprietary (allowing for dividend), 6d.; Cape Copper, 1s. 3d.; Copiapo (allowing for dividend), 3d.; Frontino (allowing for dividend), 3d.; Kempinkote, 3d.; Mysore Reefs, 1s.; Namaqua, 1s. 3d.; New Queen, 3d.; Nine Reefs, 1s. 3d.; Nine Reefs (fully-paid), 1s. 3d.; Pinos Altos, 6d.; Poorman, 3d.; Richmond, 1s. 3d.; Ripanji, 4s.; Victory, 6d.; Yerraconda, 3d.

#### Australian.

Risen : Australian Land, 1s. 3d.; Bayley's Reward, 1s. 6d.; Hampton Plains, 3s. 9d.; London and Western Australian, 3s. 9d.; Mawson's, 1s. 3d.; West Australian Concession, 2s. 6d.; Western Australian Gold Fields, 3s. 9d.—Fallen : Blackett's, 1s. 3d.; Goleconda, 1s. 3d.; Kinsella, 6s. 3d.

## LATEST FROM THE MINES.

### CABLEGRAMS AND TELEGRAMS.

ALADDIN'S LAMP.—The following cablegram has been received from the mine:—"348 tons of ore have been crushed during last four weeks, yielding 1500 ounces of gold. Good ore continues on the 500 foot level, and we are pressing on the cross-cut on the 600 foot level."

ALASKA TREADWELL.—Cablegram from Alaska announces the December clean-up as follows:—"Shipment of bullion \$44,347, tons of ore milled 19,807, tons of sulphurates treated 375, of bullion there came from sulphurates \$14,615. Estimated gross expenses for the period has not yet been ascertained."

BRILLIANT.—The following telegram has been received from Charters Towers: "2280 tons, 2667 ounces. Dividend No. 55 4d. per share, and a bonus of 3d. per share."

BRILLIANT BLOCK.—The following cablegram has been received from Charters Towers: "Have crushed during the month 2238 tons of quartz for a yield of 2064 ounces of gold."

The profit on the run is £3500. Have declared a dividend of 6d. per share, payable on January 7." The approximate value of this return is £7120.

BAKER'S CREEK.—Result of crushing for fortnight 948 ounces retorted gold, including 368 ounces from plates.

BROKEN HILL PROPRIETARY.—For the week ended the 20th inst. 10,156 tons of ore were treated, yielding 860 tons of lead, containing 225,431 ounces of silver; also 1150 tons treated by amalginating and leaching plants, producing 12,113 ounces of silver. A dividend of 1s. per share is declared payable on January 16, the books for which will be made up on the morning of the 2nd of that month.

DAY DAWN BLOCK AND WYNDHAM.—Crushed 525 tons of quartz, taken from all parts of the mine, for a yield of 482 ounces of gold. The approximate value of this return is £1650.

ELKHORN.—Bullion produced in the mill for the week ended December 22, 8900 ounces.

EL CALLAO.—Messrs. Baring Brothers and Co. have received the following telegram from El Callao Mining Company:—"326-350 ounces of gold produced by El Callao Mine for past fortnight, and 1101-1125 ounces by the Colombia Mine. Strike is virtually at an end."

FRONTINO AND BOLIVIA.—The directors have received advices from the mines dated October 23 and November 9, also a letter from Messrs. Restrepo dated October 12. The statement for the month of October is as follows: 3463 tons produced (bar gold) 3383 ounces; tributaries gold produced (bar gold) 144 ounces; total, 3527 ounces. Also 51,060 lbs. of sulphurates, valued at £993 9s. 7d. Estimated value of the gold and sulphurates, £9478 3s. 7d.; cost at the mines, Medellin, and in London, £5919 15s. 5d.; estimated excess of returns, £3558 8s. 2d. The directors have received a cablegram from Mr. Eustice giving the results for November as follow: Estimated value of gold, £10,820; estimated cost, £6280; estimated excess of returns for November £4540.

GLENCAIRN MAIN REEF.—The London agents announce receipt of the following cable:—"Interim dividend at the rate of 7½ per cent. has been declared. Transfer books will be closed from 2nd to 11th January, both dates inclusive. 20 new stamps started 24th December."

HANNAN'S BROWN HILL.—The following is copy of cablegram which has been received with reference to this company's property:—"Have struck a rich body of ore at a depth of 106 feet. Have driven 3 feet into the vein, and have not yet got to the footwall."

KELLY'S QUEEN BLOCK (Charters Towers).—Cable, dated Brisbane, 22nd inst.:—"Crushed 470 tons for 780 ounces, and declared dividend of 6d. per share."

MOUNT LEYSHON.—The Mount Leyshon (Limited) have received the following cablegram, dated 24th inst., from their manager at Charters Towers, giving the fortnightly crushing:—"255 tons crushed 255 ounces gold. 35 stamps out of 40 ran 12 days. Profit, £135. Mill stopped for repairs on 22nd. Will start work again on 1st January."

MEYER AND CHARLTON.—Cablegram from the Johannesburg secretary:—"Dividend of 30 per cent. declared for six months ending December 31, 1894. The dividend warrants will be issued from the head office, Johannesburg, immediately upon receipt of the European transfers up to December 31, 1894."

NEW DOURO.—Mill return for month of October and November: Mill worked 19 days. Ore crushed 154 tons. Gold recovered 86 ounces.

NEW QUEEN.—Result of crushing for past fortnight:—No. 1 formation, 235 tons, yielding 285 ounces of gold. No. 4 formation, 13 tons, yielding 9 ounces of gold.

NEW PRIMROSE.—The London agents of the above company announce receipt of the following cable:—"Dividend for half-year 20 per cent. Transfer books will be closed from 2nd to 11th January, both dates inclusive. 60 new stamps will start 1st January."

NO. 2 GREAT EASTERN.—Cablegram, dated Gympie, December 24th:—"Crushed 1650 tons for 740 ounces, and declared 6d. dividend."

NO. 1 NORTH SMITHFIELD.—Cable, Gympie, December 24th:—"Crushed 70 tons for 93 ounces."

NORTH SMITHFIELD.—Gympie, December 24th:—"Crushed 152 tons for 426 ounces; declared dividend 6d. per share."

1 NORTH PHENIX.—Cablegram dated Gympie, 24th inst.:—"1 North Phenix crushed 200 tons, yielding 626 ounces gold. Dividend declared 1s. per share."

NO. 5 NORTH PHENIX.—Gympie, 24th inst.:—"Crushed 20 tons for 265 ozs."

ORION.—The following cablegram has been received from South Africa:—"The supplementary Articles of Association have been duly registered. All formalities are now complete."

ORITA.—The directors have received the following cablegram from their superintendent relating to Run No. 83.—"We have cleaned up £300; the profit on which is £150."

PHENIX P.C.—Cablegram, dated Brisbane, 22nd instant:—"Phenix P.C. (Gympie) crushed 905 tons for 3867 ounces, and declared a dividend of 4s. 6d. per share."

ROBINSON.—The following cablegram from the head office at Johannesburg to hand:—"Close books, 5th to 12th January. Declared dividend at the 5 per cent., payable on receipt of London Transfers."

SOUTH GLANMIRE AND MONKLAND.—Gympie, December 24th:—"Crushed 2,350 tons for 780 ozs. Dividend of 3d. per share declared."

SUTHERLAND REEF.—Cablegram received from the mine manager:—"Assay of ore at 210 feet level east drive, 15 ounces 10 dwts.; 210 feet level, west drive, 11 ounces; and winze, 210 feet level, 13 ounces per ton."

UNITED MEXICAN (San Cayetano).—Gross returns for week ending 15th December, \$840; expenses, \$1100—loss, \$260. El Cubo.—Gross returns for week ending 15th December, \$7,384; expenses, \$5,410—profit, \$1,974.

VILLAGE MAIN REEF.—In November the mill ran 27 day, crushed 3450 tons, which yielded 2000 ounces free gold, and 890 concentrates, assaying 3·14 ounces; tailings assay 4½ dwts.; 343 ounces from concentrates.

VICTORY (Charters Towers).—The London office has received the following cablegram from the head office in Sydney:—"Crushing for the fortnight from No. 2 shaft, 165 tons for 180 ounces of gold."</p

## REVIEWS.

## ELECTRIC MOTIVE POWER.

*Electric-Motive Power.* By Albion T. Snell, C.E., M.I.E.E. (Published by the Electrician Printing and Publishing Company, Limited, Salisbury Court, E.C.)

The introduction of electricity as a motive power for mining machinery has necessitated its study by mining men and its modern application to lighting and power. This book, therefore, comes at an opportune moment, and although a portion of it is devoted to the theories upon which both dynamos and motors are constructed, yet a large part is taken up with the practical application of electricity for mining purposes, with numerous illustrations of the machines employed, descriptions of their use, and the manner in which the connecting cables are laid. It will, therefore, be a welcome addition to the library of the mining engineer, who will find its well written and well illustrated pages full of interesting and valuable information.

The author does not enter into an elementary discussion of the principles underlying the construction of dynamo electric machines, but aims at the development of the lines on which these principles are applied in practice. He assumes that his readers are already acquainted, to some extent, with the rudiments of the science of electricity, and working upon this foundation he takes them through a course involving the theory and construction of dynamos and electro-motors, the various systems of distributing power and light; and finally, the application of the power to running purposes.

In the introduction he refers to the possibility of erecting central power stations at some point convenient to number of mines, and then distributing the power amongst various consumers on a basis similar to that adopted for electric lighting. As far as we are aware, this idea has not been carried into practice at home, but abroad, and more especially in America, we have reason to believe that it has already been adopted with success. Several leaders on the subject of electricity as a motive power have already appeared in the columns of *The Mining Journal*, and as the author of the book under notice rightly points out, one of the chief advantages of the system is—that power is thereby transmitted without involving the transference of matter, as is the case with steam or air. Distance, also, is not a factor in the case; while the sharpest curves, whether vertical or horizontal, do not appreciably affect the case, so that on all these points electricity has an enormous advantage over the older systems, especially where natural water power is available as the prime source of power.

After treating in Chapter I. of the general plans of electrical transmission of power, the author devotes Chapter II. to the theoretical construction of dynamo and motors, and then in Chapter III. describes the line and distributing mains, the methods adopted for erecting aerial lines, and the laying of underground ones as well as the protection of the aerial lines from lightning discharges. Chapter IV. is devoted to the consideration of direct current systems of transmitting and distributing electric power and continuous current transformers or dynamotors, while Chapters V. and VI. deal with single-phase alternators, alternate current motors, and the transformers or converters used in connection therewith. Following this, and maintaining the same plan as when describing the direct current system, comes a description in Chapter VII. of the transmission and distribution of the alternate current, and the advantages and disadvantages of the system; while Chapter VIII. describes the working of polyphase alternate currents.

The last two chapters of the book are of especial interest to mining men, as they deal exclusively with the question of the electric transmission of power in mining operations, and are full of practical instructions relative to the installation and working of the power plant, the erection of the cables whether in the shaft or underground, and the details of the distribution of the current to the various motors. In metalliferous mining there is, of course, no danger of explosion arising from the sparking of the motor, or any of the electrical appliances, but such is not the case in collieries where the strictest precautions must be taken that all the switches, cut-outs, junction-boxes and resistance frames are absolutely flame and dust-tight, or otherwise in fiery mines a most disastrous explosion might result. The author speaks very strongly upon this matter, and characterises the use of certain types of switches and cut-outs in mines where naked lights are not allowed as madness, and anticipates the subject becoming one for special legislation in the future. As the matter is one of the greatest importance we quote his conclusion to the effect that the ensuring of "absolute freedom from fiery gas with a continuous current motor is perhaps impossible, but no such difficulty should be found with small stationary devices such as switches, cut-outs, and junction-boxes. It is merely a matter of expense, and proper precautions should be insisted upon in all permanent plants."

Danger of explosion from sparking also occurs when a cable is accidentally broken, as, for example, by a fall of roof, and this has led to the invention of safety cables, some examples of which are fully described, though in the opinion of the author the danger of firing gas from this cause is very remote, no authentic instance having as yet occurred. The greatest difficulty, however, lies in the designing of a continuous current motor perfectly free from the risk of firing gas from sparks at the commutator, or from short circuits in the coils, and various devices are described by which it has been sought to overcome this danger, which the author sums up by concluding that the only real safeguard from sparking at the brushes and commutators is to do away with them altogether, and the only way in which this is practicable at present is by the use of polyphase motors. The book is brought to a close by a description of coal cutting and rock drilling by electric machinery, and an appendix on long distance transmission of power, and the cost and efficiency of various systems.

As we have already stated, we consider that a study of this book will be found eminently useful to the mining man who is desirous of keeping himself abreast of the times, or who may be called upon at any moment to adopt electricity as a motive power at the works under his control.

**BRITISH GULANA GOLD INDUSTRY.**—The amount of gold entered at the Customs House on the 29th November, for shipment by the R.M.S. *Des* which sailed the same afternoon, was 4496 ounces 17 dwts. 21 grains, to the value of \$80,291, a decrease in the previous shipment of 6300 ounces 2 dwts. 8 grains, to the value of \$111,295. With this addition the total output for the year amounts to 114,714 ounces 18 dwts. 10 grains, to the value of \$2,044,683. The following is the return of gold entered at the office of the Department of Mines for the weeks ending:—

	Nov. 24.	Dec. 1.	Dec. 8.
Ozs. dwts. grs.	Ozs. dwts. grs.	Ozs. dwts. grs.	Ozs. dwts. grs.
Barama .....	81 0 15	149 15 9	125 8 22
Barima .....	522 13 4	342 7 4	537 9 3
Conawarook .....	859 16 13	—	—
Cuyuni .....	462 1 17	410 5 5	281 1 5
Esequebo .....	42 16 0	422 6 17	858 8 9
Groote Creek .....	—	—	14 16 10
Potaro .....	425 13 2	157 11 5	417 13 7
Puruni .....	58 9 16	265 9 4	20 11 7
Total .....	2452 10 19	1747 14 20	2255 9 0

## REPORTS FROM THE MINES.

We find it necessary to announce that, owing to the vast numbers of mining reports, and items of mining intelligence which reach us invariably every late-up to, and frequently after the time of going to press—it is impossible to guarantee the insertion of all of them in the issue in which, in ordinary course they should appear. We always endeavour, however, to make this important feature as complete as possible, and if the secretaries of mining companies, mining captains, and others would kindly make an effort to let their reports, etc., reach us early on Fridays, when it is not possible to let them earlier in the week, their doing so would go far to ensure their insertion, and to promote the completeness of our Mining Intelligence.

## BRITISH MINES.

**CARN BREA.**—December 21: Highburrow east. The cross cut at the 334 fathom level is driven about 10 fathoms south of Harvey's engine shaft, and we have not yet cut the lode. According to the position and bearing of the lode driven on in the 325 fathom level east and west of Highburrow west shaft it would appear that we have some fathoms further to drive to reach it. We have this week commenced driving the 322 fathom level east of Harvey's shaft by boring machinery, and have driven about 6 feet. The lode is fully the size of the end and of promising character, but not sufficiently productive to value. We hope and expect that this end will improve as we drive east under the tin bearing ground passed through in the 310 fathom level. The 310 fathom level is driven 7 fathoms east of the cross course (or 67 fathoms east of the shaft), lode in end worth £15 per fathom.—Highburrow west. The lode in the 298 fathom level east of rise on south part of lode is worth £13 per fathom. In the rise and stope in back of the 298 fathom level west £20 per fathom. As was mentioned in our last report one of our best stopes here has been idle for some weeks, the men having been engaged in securing it with timber. We have got this in working order again, and hope, after the Christmas is past, to have an improvement in our returns.—Old sump. The driving of the 244 end east on drive, north lode has been very much interfered with during the past month through the water being in by the necessary stoppage of the engine whilst changing a main rod at the 20 fathom level. We hope to be driving this end again the latter part of next week. We have a promising lode here.—(Signed) W. T. White and agents.

**DEVON GREAT CONSOLS.**—Wm. Clemo, December 27: Wheal Anna Maria, engine shaft. In the stope in the bottom of the 110 fathom level east the lode is large and good, and is yielding 15 tons mundic ore per fathom. In stope in the back of the 110 fathom level east there is also a good lode, producing 8 tons copper ore and 6 tons mundic per fathom.—Field shaft, south lode. In the stope in the bottom of the 130 fathom level west the lode is a productive one, yielding 12 tons mundic ore per fathom.—Wheal Josiah, Field shaft. The stope in the back of the 130 fathom level east on the south lode is producing 8 tons mundic per fathom.—Richard's shaft. The stope in the bottom of the 115 fathom level east on the main lode is yielding 10 tons mundic per fathom.—Agnes' shaft. In the stope in the back of the 103 fathom level west of Agnes shaft, the lode is worth 4 tons of copper and mundic ore per fathom.—Wheal Emma, Thomas shaft. In the stope in the bottom of the 100 fathom level east the lode is producing 2 tons of copper ore and 10 tons mundic per fathom. The stope No. 2 in the bottom of the 100 fathom level east is good and productive yielding 1 ton of copper ore and 14 tons mundic per fathom. The stope in the back of the 100 fathom level east is producing 1 ton copper and 9 tons mundic per fathom.—Inclined shaft. In the stope in the back of the 150 fathom level east the lode is worth 2 tons of copper ore and 4 tons mundic per fathom. In No. 2 stope in the back of the 150 fathom level east the lode will produce 2 tons copper ore and 2 tons mundic per fathom. The stope in the back of the 112 west is yielding 6 tons mundic per fathom. Stope in back of 100 west is producing 1 ton copper ore and 5 tons mundic per fathom.—New shaft, new south lode. In the stope in the bottom of the 130 fathom level east the lode is producing 3 tons of copper ore and 3 tons mundic per fathom. In the No. 2 stope in the bottom of the 130 east the lode will yield 3 tons copper ore and 3 tons mundic per fathom.—Watson's. Owing to the flood and the injury caused to the lead and the head weir, the stopes in this part of the mine have been under water. This water is now drained to the 112 fathom level, and draining below that level is being steadily continued.

**LEADHILLS.**—W. H. Paull, December 24. Brown's vein. The 160 fathom level north of Jeffrey's shaft is being advanced at a fair rate on an encouraging vein over 4 feet wide, chiefly spar mixed with lead ore, worth 60 cwt. per fathom. The vein in same level driving south of Wilson's shaft is not so soft and shows a mixture of spar, but without ore. The stope over this level south of Jeffrey's shaft is yielding 30 cwt. of ore per fathom. Nos. 2, 3 and 4 stopes above the 145 north of Jeffrey's shaft are worth together 85 cwt. of ore per fathom. The vein in the 115 fathom level north of Jeffrey's shaft is over 4 feet wide, mostly stone which is too dried for bearing ore. No. 2 stope over this level north of Jeffrey's shaft will produce 25 cwt. of ore per fathom. The vein in the 100 fathom level south of Wilson's shaft is over 4 feet wide, charged with promising spar, but without ore. There is no particular change in the crooscut going eastwards at this level south of Wilson's shaft. The drift from No. 1 stope above the 100 south of Wilson's shaft is producing 25 cwt. of ore per fathom. The vein in the 85 fathom level south of Wilson's shaft has improved in character, composed of stone and spar, with spots of ore not, however, to value. In No. 1 stope over the 85 south of ditto the vein will yield 70 cwt. of ore per fathom. The stope above the 50 fathom level south of flat rod shaft is worth 35 cwt. of ore per fathom. The stope below the 35 south of ditto will produce 30 cwt. of ore per fathom. In stope above ditto south of ditto the vein is yielding 30 cwt. of ore per fathom. Sarowcole vein, Gripp's adit level, south of George's Rous vein, is going forward on a vein 4 feet wide, composed of very nice looking stone and spar.

## COLONIAL, INDIAN, AND FOREIGN MINES.

**GOLD FIELDS OF MYSORE.**—Report on prospecting operations for two weeks ending December 3. West Balanghat Block, No. 1 shaft. The 117 feet level north of shaft has been driven 6 feet, total length 120 feet. Lode 1 foot wide assaying 13 dwts. 2 grains of gold per ton. 117 feet south driven 3 feet 9 inches, total length 110 feet 6 inches. Lode 2 feet wide, assaying 10 dwts. of gold per ton.—No. 2 shaft. The 100 feet level north has been driven 5 feet, total length 111 feet 11 inches. Lode 1½ feet wide, carrying 9 inches of quartz, assaying 15 dwts. 2 grains of gold per ton. 100 feet south driven 4 feet 3 inches, total length 123 feet 9 inches. Lode 1 foot wide, assaying 9 dwts. 2 grains of gold per ton.—No. 3 shaft. This shaft has been sunk 1 foot, total depth 126 feet 4 inches. Lode 1 foot wide, assaying 13 dwts. 16 grains of gold per ton. 117 feet level north driven 4 feet, total length 47 feet 6 inches. Lode 9 inches wide, assaying 1 ounce 1 dwt. 12 grains of gold per ton. 117 south driven 8 feet, total length 113 feet 6 inches. Lode 6 inches wide, assaying 16 dwts. 4 grains of gold per ton.—No. 4 shaft. The 148 feet level north of shaft has been driven 4 feet 9 inches, total length 32 feet 9 inches. Lode small, yielding a trace of gold. 148 south driven 3 feet 6 inches, total length 25 feet 9 inches. Lode 3 feet wide carrying 18 inches of quartz, assaying 1 ounce 1 dwt. 10 grains of gold per ton.—Road Block, north shaft. The north level from bottom of this shaft, 62 feet from surface, has been driven 5 feet 6 inches, total length 41 feet 6 inches. Lode 1 foot wide, assaying 10 dwts. 2 grains of gold per ton. South level driven 7 feet 6 inches, total length 46 feet 6 inches. Lode 6 inches wide, assaying 18 dwts. 2 grains of gold per ton.—No. 3 shaft, north of No. 2, south level from bottom of this shaft, 53 feet from surface, has been driven 9 feet 6 inches, total length 120 feet. Lode 2½ feet wide, assaying 16 dwts. 17 grains of gold per ton.—Ajjapalli Block. The shaft in trench has been sunk 4 feet 9 inches, total depth 66 feet. Lode

**LINARES.**—Mine report dated December 19: Pozo Ancho Mine. In the 200 fathom level driving east of No. 276 winze (on Warne's lode) the lode continues unpredictable. In the 200 west of that winze, on the same lode, the lode is improving and yields stones of ore occasionally. The lode in the 178 west of Warne's cross cut is large and promising, with fine lumps of ore, and is valued at 1 ton per fathom. In the 200 west of Peill's engine shaft the lode is compact and regular, but it does not contain ore enough to value. The lode in the 155 west of the same shaft is small, consisting chiefly of carbonate of lime and yielding a little ore, and is estimated at ½ ton per fathom.—Los Quinientos Mine. Taylor's engine shaft. In the 185 fathom level driving east the lode is more open than it was, and yields good stones of ore. The lode in the 165 east has very much improved during the past week, and is now valued at 2 tons per fathom. In the 150 east the lode is very regular and yields good stones of ore. The lode in the 130 east contains a little ore, but not sufficient to value. Benito's winze sinking below the 165 fathom level valued at ½ ton per fathom. This new winze is situated east of Taylor's engine shaft, and in advance of the 185 fathom level.

*Mine Reports continued on Page 1452.*

## THE METAL MARKETS.

## LONDON METAL MARKET.

THE METAL MARKET, LONDON, DECEMBER 28.

## Copper.

THE speculative market opened on Thursday (after the holidays) in firm tendency and at an advance of 5s. per ton s.c. being done at £41 6s. 3d. and £41 7s. 6d., and in the afternoon three months at £41 15s. The turnover only amounted to 350 tons. On Friday about 500 tons changed hands at £41 6s. 3d., £41 5s. s.c. and £41 13s. 9d. and £41 12s. 6d. middle of March, the market closing at £41 3s. 9d. buyers of s.c. and £41 11s. 3d. buyers of three months. The American market continues strong and that country is again in our market as a buyer of refined copper, which sort is firmly held here by all producers.

## Tin.

Thursday's market opened flat, and was further depressed by "bear" sales for distant deliveries. Buyers were conspicuous by their absence, and in this condition of things the value, after opening at £62—fall of 15s.—and touching £62 5s., declined to £62 again. The total transactions for the day were about 125 tons. To-day business has been done in Straits at £61 7s. 6d. to £61 3s. 9d. The close is steady at £61 2s. 6d. to £61 7s. 6d. s.c. and forward. In the Dutch market Billiton opened at 38 fl. for s.c. and three months, and closes at 37½ fl., with Banca s.c. at 38 fl.

## Pig Iron.

The Glasgow market was flat on Thursday, with business at 42s. 0d. down to 41s. 10d., and at the close there were no buyers above 41s. 10d. To-day the tone was duller still, and values continued to decline, closing at 41s. 7d. s.c., with hematite at 42s. 9d., and Middlesbrough at 34s. 10d.

## Lead.

remains steady, but extremely quiet, at £9 11s. 3d. soft foreign, and £9 13s. 9d. English.

## Spelter.

This article is also without animation, and the quotation is rather easier at £14 5s. ordinaries, and £14 7s. 6d. specials.

## Antimony.

continues entirely without new feature, and the value is steady at £33.

## Quicksilver.

is steady at £9 12s. 6d. firsts, and £9 11s. to £9 11s. 6d. seconds.

The following are to-night's (December 28) prices of metals:—

	Copper.	Alloys.	Tin.	Ferrobronze (V
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# "THE MINING JOURNAL" SHARE LIST.

**DEFINITIONS AND REFERENCES.**—The following are the significations of the abbreviations and references which occur in the Share List:—*A*, Antimony; *B*, Bismuth; *C*, Copper; *D*, Diamond; *E*, Gold; *F*, Iron; *G*, Lead; *H*, Manganese; *I*, Nitrates; *P*, Phosphates; *Q*, Quicksilver; *R*, Ruby; *S*, Silver; *T*, Tin; and *Z*, Zinc. \* in the "called up" column of British Mines, signifies that the mine is conducted on "Cost Book" principles; I in the "Head Office" column of African Mines, signifies that the address given is not that of the head office, but of a sub- or transfer office and I, following the names of African mines, signifies that they are subject to the Limited Liability Law of the South African Republic.

The following is by far the most complete and comprehensive list of mines, in whose shares business is being currently transacted, published. Additions will be made from time to time as occasion requires. Every effort is made to ensure accuracy, and Secretaries of Companies, Share dealers, and our readers generally, are cordially invited to co-operate with us to this end, by notifying us of any errors that may at any time occur. We desire it to be understood that, while our Share List will almost invariably be found correct; we do not hold ourselves responsible for any loss or inconvenience that may arise from possible inaccuracies.

## BRITISH MINES.

Name.	Closing Price, Dec. 28, 1894	Closing Price, Dec. 21, 1894	Par.	Latest Dividend	Called up Per Share.	Amount of Stock or No. of Shares Issued	Situation of Mine.	Head Office	
Blue Hills ... CT	2/6 5/-	2/-	£ s. d.	2/- May, '94	5 15 8	5,353	Cornwall	Camborne.	
Botallack ... T	3/4 3/4	3/2	1 0	*	51 4	1,280	Cornwall	St. Just.	
Carn Bras ... T	3 3/4	3	1 0	*	2/6 Dec., '94	22 8 5	8,000	Cornwall	Carn Bras.
Cook's Kitchen ... T	1/8 2/-	1/8	1 0	*	—	35 15 10	4,900	Cornwall	Camborne.
Devon Gwion CA	par 1/4 pm	1 0	1 0	0	0	25,000	Near Tavistock	8, Finsbury circus.	
Devon Gr. Cons. CA	1/6 1/4	1/5	5 0	3/- Nov., '94	2 0 0	10,240	Devon	8, Finsbury circus.	
Dolcoath ... T	40 42	40	1 0	*	12/8 Apr., '94	9 12 6	4,700	Cornwall	Camborne.
Drakethorn CTM	1/1 1/8	1/-	0 5	—	—	0 2 0	61,856	Cornwall	Dashwood House.
East Pool ... AT	3/4 4	3/4	1 0	*	1/6 Sept., '94	0 9 9	8,400	Cornwall	Illogan.
Gawton ... CA	—	2 10	2 10	2 7 3	—	12,000	Devon	20, Great St. Helens.	
Great Laxey ... L	1 1/4 2 1/4	1 1/4	4 0	5/- Apr., '94	4 0 0	15,000	Isle of Man	Douglas, Isle of Man.	
Green Burth ... L	1/8	1/8	1 0	—	—	0 19 0	32,00	Cumberland	Newcastle.
Halkyn ... L	—	—	1 0	2/- Sept., '94	1 0 0	10,000	Flintshire	Chester.	
Heworth ... T	—	—	1 0	—	—	1 0 0	6, Queen-street-place	6, Queen-street-place.	
Isle of Man ... L	—	5 0	1/6 Dec., '94	5 0 0	14,000	Isle of Man	Chester.		
Killifirth ... T	1 1/4 1 1/4	1 1/4	—	1/6 Nov., '94	5 11 6	6,000	Cornwall	Truro.	
Leadhills ... L	15/— 20/—	15/—	6 0	3/- Sep., '94	6 0 0	20,000	Lanarkshire	30, Finsbury circus.	
Levant ... CT	3/4 4	3/4	—	4/- Nov., '94	11 9 6	2,500	Cornwall	Penzance.	
Lovell ... T	—	—	—	1/2 Nov., '94	1 16 7	7,165	Wendron	3, Gt. Queen-st. S.W.	
Minera ... L	—	—	—	5/6 Mar., '95	5 0 0	8,000	Denbighshire	Minera, N. Wales.	
Nenthead & Tude, LZ	2/—	2/—	1 0	6% Feb., '91	0 18 0	4,800	Northumberland	Newcastle-on-Tyne.	
New Cooke Kitn, TC	—	—	—	—	10 18 3	4,800	Cornwall	Cambridge.	
New Minera ...	—	—	1 0	1/— Oct., '92	1 0 0	30,000	North Wales.	6 Queen-street-place.	
Parc ... LZ	—	—	1 0	—	—	5,200	Llanrwst	Biliter sq. buildings.	
Phoenix United TC	1/5 2/—	1/6	•	1/— Mar., '95	7 4 6	10,465	Cornwall	Llanrwst.	
Polherd ... T	7 1/2	3/4	—	—	3 7 9	18,000	Cornwall	37, Walbrook.	
So. Conduffor TC	2/8 5/—	2/8	—	3/6 Apr., '93	7 12 1	8,123	Cornwall	20, Great St. Helens.	
S. Francis Untd, T	7/6 12/6	5/—	—	—	17 7 6	6,120	Cornwall	Pool, Cornwall.	
Tincroft ... T	5 5/4	5	—	—	2 7 6	6,000	Cornwall	Redruth.	
Weardale ... L	9/—	4 0	—	2/— Aug., '94	15 7 8	6,000	Cornwall	Carn Bras.	
West Frances ... T	2/6 7/5	2/5	—	2/— May, '95	18 4 7	6,144	Cornwall	3, Lombard-court.	
West Kitty ... T	4/4 5/4	5	—	3/— Aug., '94	1 2 0	6,000	Cornwall	37, Walbrook.	
Wheat Agar ... TA	2/6 7/8	2/6	—	2/— Aug., '94	23 15 2	6,000	Cornwall	Redruth.	
Wheat Bassett ... TC	7/6 12/6	7/8	—	10/— Apr., '98	12 3 0	6,144	Cornwall	1/0, Cannon-st., E.C.	
Wheat Friendly ... T	7/5 1/—	—	—	—	0 12 9	10,000	Cornwall	7, Union-court, E.C.	
Wheat Grenville ... T	12 13	11 1/4	—	2/— Nov., '94	18 2 0	6,000	Cornwall	Truro.	
Wheat Kitty ... T	1/— 3/—	1/—	—	3/— Mar., '95	4 5 8	8,890	Cornwall	14, Broad-street Av.	
Wheat Metal & F.T.	3/4 3/4	3/6	—	—	0 13 9	10,784	Cornwall	—	

## AUSTRALIAN AND NEW ZEALAND MINES.

Name.	1/6 dis par	1/6 dis.p.	1 0	—	0 10 0	100,000	Murchison	17, Old Broad st.
Abbotts ... G	1/6 dis par	1/6 dis.p.	1 0	—	1 0 0	80,307	New Zealand	3, Church Pas., E.C.
Achilles Gld Flc.	2/8 3/8	2/8	1 0	—	1 0 0	100,000	N. S. Wales	4-6, Throg. Avenue.
Aladdins Lamp G	1 1/1%	1	—	1/— Dec., '94	1 0 0	75,000	Queensland	5, Throg. Avenue.
Amans (Went) G	—	—	—	2/— July, '95	1 0 0	51,000	W. Australia	4, Lombard-court.
Austin ... G	1/6 1/6 pm	1/6 pm	1 0	—	0 12 6	50,000	W. Australia	6, Queen-st. place.
Australian ... G	4/4 4/6	2/9	1 0	—	0 21 0	210,000	Queensland	6, Queen-st. place.
Australian ... C	1/9 2/3	1/9	20 00	1/8 July, '94	7 7 8	18,315	Queensland	6, Queen-st. place.
Aus. Bro. Hill Con.	Baker's Creek ... G	1/3 13%	1	1/— Dec., '94	1 0 0	100,000	N. S. Wales	7, Old Jewry Chbrs
Bayley's Reward G	12/6 15/—	15/—	1 0	—	0 17 6	112,000	W. Australia	8, Woodhouse.
Blackett's Claim G	12/6 15/—	15/—	1 0	—	0 17 6	100,000	W. Australia	9, Higrove, N.S.Wales
Big Blow ... G	2/4 2/—	2/—	1 0	—	0 15 0	100,000	W. Australia	10, Hillgrove, N.E.C.
Brilliant ... G	21/22 23/24	19/—	—	4/— Jan., '95	0 15 0	120,000	Queensland	11, Old Jewry Chbrs
Brilliant Block ... G	11/12 13/14	13/—	2 00	1/— Jun., '95	2 2 0	250,000	Queensland	12, Lombard-court.
Brilliant, St. Geo. G	29/31 31/29	29/—	6 0	6d. Dec., '94	0 16 3	72,000	Queensland	13, Gracechurch-st.
Brit. Brok. Hill S	8/7 7/—	5/6	—	—	5 0 0	240,000	N. S. Wales	14, Sherborne In., E.C.
Broker Hill Prop.	1/2 1/3	1/3	—	1/— Jan., '95	0 16 0	98,000	W. Australia	15, Blomfield Ho., E.C.
Cashman Bril ... G	15/16 15/17	15/16	1 0	—	0 12 6	100,000	Queensland	16, Blomfield Ho., E.C.
Carrington ... G	3/3 3/6	2/3	1 0	—	0 12 6	100,000	Queensland	17, Blomfield Ho., E.C.
Con. G. M. of W.A. ... G	10/10 11/12	11/12	—	—	0 12 6	40,000	Queensland	18, Blomfield Ho., E.C.
Coolgardie ... G	3/3 4/1	3/6	—	—	0 12 6	40,000	Queensland	19, Blomfield Ho., E.C.
Craven's Cal. ... G	3/3 4/3	3/6	—	—	0 12 6	40,000	Queensland	20, Blomfield Ho., E.C.
Crown Bayley's ... G	3/3 5/—	5/—	—	—	0 10 0	100,000	Queensland	21, Blomfield Ho., E.C.
Croydon King B. G	3/5 5/—	5/—	—	—	0 10 0	60,000	N. Queensland	22, Winchester Av.
Cumbrind (New) G	1/8 2/—	1/3	1 0	2/— Dec., '97	1 0 0	184,790	Queensland	23, Old Broad-st.
Day Dawn B.W.G.	9/10 12/—	9/—	1 0	1/— Mar., '95	1 0 0	94,490	Queensland	24, Old Broad-st.
Day Dawn P. C. G.	5/3 5/9	6/3	—	—	0 10 0	190,000	Queensland	25, Gracechurch-st.
Eaglehawk ... G	2/— 2/8	2/—	1 0	—	0 19 6	120,000	Victoria	26, Sherborne In., E.C.
Empress Cooley G.	3/4 3/4	3/6dis par	1 0	—	0 10 0	90,000	W. Australia	27, Winchester Av.
Eng. & Aus. Cop. Cu	5/— 5/—	5/—	—	—	0 10 0	87,000	Queensland	28 & 29, S.W. Swin'ln's.
Etheridge ... G	—	—	—	—	0 10 0	60,000	Queensland	30, 1. S. Swin'ln's.
Frederick the Gt G	par 1/4 pm	1/4 pm	1 0	—	0 12 6	125,000	Queensland	31, Old Broad-st.
Glenrock ... G	1/3 1/9	1/3	—	—	0 10 0	225,000	N. Zealand	32, Old Broad-st.
Goleonda ... G	17/8 20/—	18/9	1 0	—	0 10 0	180,000	Queensland	33, Gracechurch-st.</

## "THE MINING JOURNAL" SHARE LIST—(Continued).

## SOUTH AND CENTRAL AMERICAN MINES—(Continued).

Name.	Closing Price, Dec. 28, 1894.	Closing Price, Dec. 21, 1894.	Par.	Latest Dividend.	Called up Per Share.	Amount of Stock or No. of Shares Issued.	Situation of Mine.	Head Office.
Santa Barbara ...G	—	—	£ s. d.	—	—	50,000	Brasil	Liverpool
Santa Elena ...N	56 36	56	10	1/3 Dec. '94	5 0 0	22,000	Parapac	3, Gracechurch-st.
Santa Rita ...N	33 44	34	10	5/— Oct. '94	5 0 0	20,000	Chili	Dashwood House, E.C.
Santa Sebastian ...N	23 21	23	10	5/— Dec. '94	5 0 0	29,000	Chili	Dashwood House, E.C.
Segovia ...G	—	—	—	—	—	160,000	Colombia	5, Cophall-buildings
Socre Pref. ...G	—	—	1 0	10/— Dec. '94	1 0 0	840	Colombia	23, St. Swithin's ln.
Socre Ord. ...G	—	—	1 0	6/— Dec. '94	1 0 0	10,000	Colombia	23, St. Swithin's ln.
Tetuan ...G	—	—	—	—	0 19 6	200,000	Colombia	5, Cophall-buildings
Tolima "A" ...S	83 83/xd	84	5	10/— Dec. '94	5 0 0	14,000	Colombia	18, Finsbury-circus.
Do. "B" ...S	7 7/xd	7	5	10/— Dec. '94	5 0 0	6,000	Colombia	18, Finsbury-circus.
Vic. & Altamira ...	1/3 1/6	1/3	0 5	—	—	200,000	Venezuela	Broad-st. Avenue.
West Indian ...G	—	—	0 5	—	—	700,000	San Domingo	49, Queen Victoria-st.
Zaruma ...G	—	—	0 5	—	—	261,422	Ecuador	1, Gt. Winchester-st.

## AFRICAN MINES—(Continued).

Name.	Closing Price, Dec. 28, 1894.	Closing Price, Dec. 21, 1894.	Par.	Latest Dividend.	Called up Per Share.	Amount of Stock or No. of Shares Issued.	Situation of Mine.	Head Office.
Langsaagte Est. G	41 43	41	3 0	2/— Jan. '95	1 0 0	467,000	Witwatersrd.	59, Holborn Viaduct, I.
Do. Royal	47 55	45	1 0	5/— Sept. '93	1 0 0	100,000	Witwatersrd.	2, Drapers-gardens, I.
Dixon-Berlyn ...G	48 5/	43	2 0	—	3 2 6	889,233	Lydenburg	110, Cannon-street.
London & S. A. Ex.	103 103/xd	104	0 10	2/— Dec. '94	1 0 0	100,000	S. Africa	19, Finsbury-circus.
Luipards Vlei Est.	14/8 15/6	14/6	1 0	6 2/ Mar. '90	1 0 0	310,000	Witwatersrd.	Warnford-court, I.
Main Reef (New) G	13 14/8	13	1 0	—	—	300,000	Witwatersrd.	8, Old Jewry.
May Con. (New) G	2 2/	1 7/	—	—	1 0 0	430,000	Witwatersrd.	4, Lothbury, I.
Mashon. Agency ...	13 13	13	1 0	—	1 0 0	100,000	Mashonaland	8, Old Jewry, E.C.
Mashon. Central ...	—	—	—	—	—	200,000	Mashonaland	73, Basinghall-st., E.C.
Matabeleland ...	—	—	—	—	—	12/8	Matabeleland	1, Crosby Square, I.
Metropolitan (N) G	13 13	13	1 0	—	1 0 0	75,000	Witwatersrd.	Warnford-court, I.
Meyer & Charl. G	63 7	7	1 0	30% Dec. '94	1 0 0	71,687	Witwatersrd.	130, Winchester Ho.
Mines Trust ...G	56 36	56	1 0	3 2/ May '94	1 0 0	82,774	S. Africa	20, Winchester Ho.
Modderfontein. G	104 104/	104	1 0	—	1 0 0	100,000	Witwatersrd.	Warnford-court, I.
Montrose ...G	13/— 14/—	—	1 0	3/— Feb. '90	1 0 0	200,000	De Kap	8, New Broad-street
Moidies G. & E. ...G	11/6 12/6	10/6	1 0	—	1 0 0	70,000	De Kap	8, Old Jewry I.
Mosambique ...G	21/— 22/—	19/—	1 0	—	1 0 0	400,000	S. E. Africa	Broad-street House.
Namaqua ...C	15/— 17/6	16/3	2 0	2/6 July '91	2 0 0	194,351	Namaqualand	34, Leadenhall-bldgs.
New Aurora West G	12/6 13/6	12/—	—	5% Mar., '93	—	30,000	Witwatersrd.	1, Crosby Square, I.
N. Belgium Land ...	5/— 6/	4/—	1 0	—	—	167,362	Waterberg	53, Cornhill.
New Black Reef ...	2/— 3/	2/—	1 0	—	—	76,000	Witwatersrd.	9, King William st.
New Chimes ...G	2 2/	2	1 0	5% Oct., '94	1 0 0	70,000	Lydenburg	8, Old Jewry, E.C.
New Clever Estate ...	17/8 17/8	17/8	1 0	5% Dec., '94	1 0 0	100,000	Langsaagte	120, Bishopsgt st. Wn.
New Crusus ...G	2 2/	2	1 0	5% Aug., '92	1 0 0	195,000	De Kap	4, Bishopsgt st. Wt.
New Edwin Brat ...	3/— 4/	3/—	1 0	5% Dec., '89	1 0 0	50,250	Griqualand	23, College Hill.
New Gordon ...D	4/— 5/	4/—	1 0	—	—	80,000	Transvaal	110, Cannon-street.
New Heriot ...G	8 8/5	8	1 0	20 p Dec. '94	1 0 0	195,000	Transvaal	1, Crosby Square, I.
New Jager. ...D	17/8 17/8	17/8	1 0	10 Nov., '94	1 0 0	100,000	Transvaal	5, Calthill-hill Tings.
New Klerkstad ...	4 4/5	4/5	2/9	—	—	80,000	Transvaal	110, Cannon-street.
New Louis D'Or. G	4/9 5/3	4/6	1 0	—	—	100,000	Transvaal	53, New Broad-stree.
New Primrose ...G	5% 6%	5%	1 0	20% Dec., '94	1 0 0	230,000	Transvaal	2, Drapers-gardens, I.
New Rietfontein G	2 2/	2	1 0	—	—	160,000	Transvaal	59, Holborn Viaduct, E.C.
New Salisbury ...G	3 3/8 3/10	3 3/8	1 0	—	—	93,000	Transvaal	30-1, St. Swithin's-in.
New Spec Bon. ...G	26/— 26/—	26/—	1 0	—	—	113,801	Transvaal	1, Crosby-square, I.
N. Ophir Concess. ...G	3/3 3/9	3/3	1 0	—	—	111,857	Coast Afric	24, N. John-st., E.P.
New Virginia ...G	6 6/	6/	4/	10% Dec., '94	1 0 0	80,000	Transvaal	31, Lombard-preet.
Nootgedacht E. G	—	—	1 0	—	—	160,000	Transvaal	26, Budget-row, E.C.
Nyassa (Bearer) ...	17/8 22/6	17/8	1 0	—	—	160,000	Transvaal	8, Old Jewry.
Oceana ...G	2 2/	2	1 0	25— Nov., '89	1 0 0	150,000	Mozambique	Bartholemew House
Oceana Develop. ...G	5/— 5/6	5/6	1 0	—	—	50,000	Transvaal	8, Sun Court, E.C.
Orange F.S.E. ...D	3 3/4 3 1/xd	3 3/4	1 0	1/— Sept., '94	1 0 0	24,000	Transvaal	4 Sun Court, E.C.
Orion ...G	6 6/5	6/5	1 0	10% Dec., '94	1 0 0	36,000	Transvaal	10, Moorgate-street.
Otto's Kopje ...D	4/8 5/	3/6	1 0	—	—	437,888	Kimberley	8, Old Jewry, E.C.
Paarl Central ...G	29/8 30/6	23/6	1 0	—	—	138,750	Transvaal	120, Bishopsgt st. Wn.
Paarl Ophir ...G	19/— 20/	17/8	1 0	10 p.c. Aug., '94	1 0 0	12,000	Transvaal	Cape Town
Pardy's Mozamb. ...G	19/— 20/	17/8	1 0	1/— Dec., '94	1 0 0	13,000	Transvaal	Broad-st. Avenue.
Pigg's Peak, New G	5/6 6/6	5/6	1 0	—	—	230,328	Transvaal	6, Queen-street, place.
Potchefstroom ...G	4/6 5/6	4/	1 0	—	—	181,000	Transvaal	19, Bury-st. E.C.
President Lind ...D	4/— 5/	4/—	1 0	—	—	193,325	Transvaal	17, Basinghall Street
Princess Estate G	1 1/2 1/2	1/2	1 0	—	—	72,046	Transvaal	33, Cornhill, E.C.
Randfontein ...G	18/6 19/6	17/6	1 0	—	—	1,916,500	Transvaal	59, Holborn Viaduct, E.C.
Rand Mines ...G	2 2/	2	1 0	—	—	332,798	Transvaal	12, Bishopsgt st. Wn.
Read's Drift ...D	16/3 18/3	15/	1 0	—	—	50,000	Transvaal	19, Finsbury circus.
Robinson ...G	4/8 5/8	7/8	5 0	5% Dec., '94	5 0 0	525,750	Transvaal	55, Holborn Viaduct, I.
Rooedeport Un. G	4/8 4/8	4/8	1 0	10 p.c. Aug., '94	1 0 0	100,000	Transvaal	55, Gracechurch-st.
Sheba ...G	28/— 29/	27/6	1 0	1/— Sept., '94	1 0 0	614,450	Transvaal	4, Sun Court, E.O.
Siliati ...G	4/— 5/	4/—	1 0	—	—	20,000	Transvaal	33, Cornhill.
Sinner & Jack ...G	13/4 14/4	12/	1 0	17% May '94	1 0 0	85,000	Transvaal	8, Old Jewry.
S. A. Gold Trust ...G	3/4 3/4	3/4	1 0	15% Nov., '94	1 0 0	220,000	Transvaal	19, St. Swithin's-in.
S. A. Trust & Fin. ...G	3/4 3/4	3/4	1 0	—	—	413,388	South Africa	15, High-st., Wt.
S. A. Gold Trust ...G	3/4 3/4	3/4	1 0	—	—	—	South Africa	1, Crosby Square.
S. A. Trust & Fin. ...G	3/4 3/4	3/4	1 0	—	—	—	South Africa	19, St. Swithin's-in.
S. A. Trust & Fin. ...G	3/4 3/4	3/4	1 0	—	—	—	South Africa	15, High-st., Wt.

## Mine Reports—Continued on page 1449.

**CHAMPION REEF.**—Superintendent's report for fortnight ending December 3: Garland's shaft. This has been sunk 10 feet 6 inches, total depth 824 feet 6 inches. Lode 1½ foot wide, assaying 2 ounces 13 dwts. 3 grains of gold per ton. The 740 feet level north of shaft has been driven 26 feet, total length 165 feet. Lode 4 feet wide, assaying 1 ounce 13 dwts. of gold per ton. 740 south driven 29 feet, total length 126 feet 6 inches. Lode 2 feet wide, assaying 2 ounces 5 dwts. 6 grains of gold per ton. The 630 feet level north of west crosscut driven 27 feet 3 inches, total length 539 feet 6 inches. Lode 4 feet wide, assaying 1 ounce 8 dwts. 14 grains of gold per ton. No. 3 rise in back of level risen 5 feet 6 inches, total height 55 feet. This is communicated with No. 2 winze below 530 north. The 530 feet level north of west crosscut driven 25 feet, total length 834 feet 3 inches. Lode 4 feet wide, assaying 1 ounce 18 dwts. of gold per ton. No. 7 new rise in back of level, 100 feet north of No. 6, risen 8 feet. Lode 4 feet wide, assaying 1 ounce 10 dwts. 6 grains of gold per ton. No. 6 rise risen 5 feet 6 inches, total height 68 feet. This is communicated with No. 4 winze below 440 north. No. 3 new winze sunk 5 feet. Lode 2 feet wide, assaying 1 ounce 4 dwts. 12 grains of gold per ton. No. 2 winze sunk 2 feet 3 inches, total depth 17 feet. This is communicated with No. 3 rise in back of 630 north. The 440 feet level north of west crosscut driven 25 feet, total length 757 feet 9 inches. Lode 2½ feet wide, assaying 2 ounces 8 dwts. of gold per ton. No. 6 new rise in back of level, 100 feet north of No. 5, risen 11 feet 6 inches. Lode 4 feet wide, assaying 1 ounce 13 dwts. 14 grains of gold per ton. No. 5 rise risen 16 feet, total height 78 feet. Lode small, 9 inches wide, assaying 15 dwts. of gold per ton. No. 4 winze below level sunk 2 feet, total depth 6 feet 6 inches. This is communicated with 530 No. 6 north rise. No. 4 winze below 310 north of west crosscut sunk 14 feet 6 inches, total depth 84 feet. Lode 3 feet wide, assaying 1 ounce 15 dwts. of gold per ton. No. 3 incline winze below levelsank 12 feet 6 inches, total depth 129 feet. This is communicated with 340 feet level south of Ribblesdale's shaft, and opened up a large section of good stoping ground, also thoroughly ventilating Ribblesdale's part of the mine.—Ribblesdale's shaft. The 540 feet level north of shaft has been driven 20 feet 3 inches, total length 251 feet 6 inches. Lode small, is 9 inches wide, assaying 18 dwts. of gold per ton. The 540 feet level south of shaft driven 21 feet 6 inches, total length 71 feet 9 inches. Lode 6 inches wide, assaying 1 ounce 6 dwts. 4 grains of gold per ton. The 440 feet level south of crosscut, east of 440, south of shaft, has been driven 22 feet 3 inches, total length 85 feet 6 inches. Lode 2 feet wide, assaying 1 ounce 15 dwts. of gold per ton. Incline winze north of crosscut sunk 18 feet 6 inches, total depth 47 feet 6 inches. Lode 4 feet wide, assaying 1 ounce 16 dwts. 14 grains of gold per ton. New rise in back of level risen 18 feet. Lode 3½ feet wide, assaying 1 ounce 12 dwts. 2 grains of gold per ton. 340 north of crosscut, east of 340 south, driven 11 feet 3 inches, total length 17 feet 9 inches. This, being back of north end of shoot, is suspended. New incline winze below level sunk 3 feet 9 inches. Lode 3½ feet wide, assaying 1 ounce 16 dwts. of gold per ton. This is a continuation of incline winze sunk below 340 north of Garland's shaft. 340 south of east crosscut driven 16 feet 3 inches, total length 79 feet 3 inches. Lode 2½ feet wide, assaying 1 ounce 10 dwts. of gold per ton. No. 2 rise in back of level risen 4 feet 3 inches, total height 96 feet 9 inches. Lode 1½ feet wide, assaying 1 ounce 7 dwts. 4 grains of gold per ton. Crosscut east of 240 south of shaft driven 6 feet 6 inches. This is communicated with incline winze below 240 north of Garland's shaft.—Carmichael's shaft. We have almost completed the bringing down of this shaft to the 440 feet level. The 315 crosscut west of shaft has been driven 19 feet 6 inches, total length 616 feet 3 inches. No change to note.—Rowe's shaft. The 415 feet level north of shaft has been driven 17 feet 6 inches, total length 49 feet 6 inches. Lode 2 feet wide, assaying 2 ounces 18 dwts. 22 grains of gold per ton. 415 south of shaft driven 14 feet 6 inches, total length 42 feet. Lode 1½ feet wide, assaying 1 ounce 15 dwts. 6 grains of gold per ton. 415 feet level north of winze sunk below 315 south of shaft driven 11 feet 6 inches, total length 27 feet 6 inches. Lode 1 foot wide, assaying 12 dwts. 8 grains of gold per ton.—Stokes: Dalyell's shaft. Stopes in back of 685 south of 620 north winze cut 11 fathoms 5 feet 3 inches. Lode 1 foot wide, assaying 14 dwts. of gold per ton. This is suspended. Stopes in bottom of 620 south of south winze cut 2 fathoms 3 inches. Lode 2 feet wide, assaying 18 dwts. of gold per ton. Stopes in back of 620, north of north rise, cut 16 fathoms 3 feet. Lode 6 feet wide, assaying 1 ounce 14 dwts. 6 grains of gold per ton. Stopes in back of 620, south of north rise, cut 9 fathoms 5 feet 6 inches. Lode 6 feet wide, assaying 1 ounce 12 dwts. of gold per ton. Stopes in back of 620, north of 530 north winze, cut 13 fathoms 4 feet 3 inches. Lode 4 feet wide, assaying 1 ounce 16 dwts. 6 grains of gold per ton. Stopes in bottom of 530, north of north rise, cut 16 fathoms 3 feet. Lode 6 feet wide, assaying 1 ounce 18 dwts. of gold per ton. Stopes in bottom of 440, north of north winze, cut 3 fathoms 3 feet 6 inches. Lode 3 feet wide, assaying 1 ounce 12 dwts. of gold per ton. Stopes south of 530 south of south winze, cut 17 fathoms 5 feet 9 inches. This is suspended for a time. New stopes south of No. 5 rise cut 10 fathoms 2 feet. Lode 2 feet wide, assaying 1 ounce 18 dwts. 4 grains of gold per ton. Stopes in back of 440 north of south rise cut 3 fathoms 5 feet 6 inches. Lode 1½ feet wide, assaying 1 ounce 12 dwts. of gold per ton. New stopes in back of 440 north of No. 3 north rise cut 6 fathoms 4 feet 3 inches. Lode 3 feet wide, assaying 1 ounce 8 dwts. of gold per ton. Stopes north of No. 2 rise cut 1 fathom 3 feet 6 inches. Lode 2½ feet wide, assaying 1 ounce 6 dwts. of gold per ton. New stopes south of rise cut 3 fathoms 2 feet 3 inches. Lode 2 feet wide, assaying 1 ounce 11 dwts. 2 grains of gold per ton. Stopes in back of 440 south of west crosscut north of rise cut 17 fathoms 3 inches. Lode 4 feet wide, assaying 1 ounce 8 dwts. of gold per ton. Stopes in back of 340 north of south rise cut 3 fathoms 5 feet. Lode 1½ foot wide, assaying 1 ounce 5 dwts. of gold per ton. Stopes in back of 240 north of No. 2 north rise cut 16 fathoms 2 feet 6 inches. Lode 2½ feet wide, assaying 1 ounce 15 dwts. 2 grains of gold per ton. Stopes south of No. 1 rise cut 9 fathoms 3 feet. Lode 2 feet wide, assaying 1 ounce 14 dwts. of gold per ton.—Ribblesdale's shaft. Stopes in back of 340 north cut 5 fathoms 3 feet 6 inches. Lode 4 feet wide, assaying 1 ounce 18 dwts. 8 grains of gold per ton. No. 1 stopes in bottom of 240 north of south winze cut 8 fathoms 5 feet 9 inches. Lode 6 feet wide, assaying 1 ounce 16 dwts. of gold per ton. No. 2 stopes north of winze cut 5 fathoms 4 feet 6 inches. Lode 4 feet wide, assaying 1 ounce 17 dwts. 4 grains of gold per ton. Stopes in bottom of 200 north of 240 south rise cut 13 fathoms 5 feet 3 inches. Lode 1 foot wide, assaying 16 dwts. of gold per ton. This is suspended. Stopes in bottom of 200 south of 240 north rise cut 10 fathoms 5 feet 3 inches. Lode 1 foot 9 inches wide, assaying 1 ounce 14 dwts. 4 grains of gold per ton. No. 1 stopes south of No. 1 rise in back of 240 south cut 2 fathoms 4 feet 6 inches. Lode 2 feet wide, assaying 1 ounce 8 dwts. 12 grains of gold per ton. No. 1 stopes north of No. 2 rise cut 11 fathoms 1 foot 3 inches. Lode 3 feet wide, assaying 1 ounce 12 dwts. 20 grains of gold per ton. No. 2 stopes cut 5 fathoms 2 feet. Lode 4 feet wide, assaying 1 ounce 5 dwts. 16 grains of gold per ton. Stopes north of No. 1 rise in back of 240 south cut 1 fathom 8 feet. Lode 3 feet wide, assaying 1 ounce 16 dwts. 4 grains of gold per ton. New

stopes in back of 440 north of east crosscut south of 340 incline winze on fold cut 3 fathoms 1 foot 6 inches. Lode 4 feet wide, assaying 1 ounce 15 dwts. 17 grains of gold per ton. The above stoping is for November month.—Returns. During November month 3900 tons of quartz were stamped, which produced 5333 ounces of gold, an average yield of 1 ounce 7 dwts. 14 grains of gold per ton. 1135 tons of tailings were treated, which produced 222 ounces of gold, an average yield of 3 dwts. 21 grains of gold per ton. A total yield of 5606 ounces of gold.

**ALAMILLOS.**—Mine report dated December 19: In the 85 fathoms level driving west of Taylor's engine shaft the lode is small and unproductive. The lode in the 160 west of the same shaft, valued at 4 ton per fathom, is promising, and produces good stones of lead. No improvement has taken place in the 100 east of Judd's engine shaft. Carillo's winze sinking below the 145 fathoms level. The lode contains spots of ore.

**FRONTINO AND BOLIVIA.**—Mr. Eustice's reports on the mines: La Salada, October 23, 1894. The mines, taken all round, show an improvement, and a hopeful one. The returns from El Silencio have surpassed any previous record, the most encouraging feature being that the ore was mined principally from the lowest levels in the mine. In supplementing the agent's monthly tabulated reports I submit the following:—El Silencio. In the shaft the sinking has progressed fairly, considering the interruption there has been during the month. The No. 6 level north is still in unproductive ground, but south it has become richer, the mineral has become larger, and is indeed one of the best points which has been met in this mine for a considerable period. In the No. 5 level north the lode is poor, and the disorganized ground is very slowly passed through; but in the south in this level the lode is good, though small (about 18 inches); but in advancing southward it may be hoped that it will widen—indications at present point to such change. There is, therefore, a large portion of rich mineral in this locality that can be counted on, and the best feature of it is that as the drivages advance the lode continues good in quality and yields well in quantity. The No. 4 north has been suspended, and a series of exploratory operations commenced, the necessity of such proceeding having emanated from the appearances which the disorganization has produced. Undoubtedly the several veins into which the main vein has been split will join somewhere in advance, but the present change has been made with the object of arriving as soon as possible to mineral large enough to need no separation; indeed, at present, the numerous veins are so small at this point that the whole mass broken is considered only as débris. If only a few, of these veins unite, the mineral contained in the united portion—although poor, can be sent to the mill with a richer grade ore, and, therefore, save much hand labour, and the gold they contain, however little, would be saved. The Bolivia crosscut in this level is in much the same class of rock, although there is an appearance of its becoming harder, and if this occurs it will deter the work. However, there is no reason to expect that any such unfavourable change would be other than temporary. There is no change in the drivage in this level south. The No. 3 level south is a good lode. Other points driving and the stopes throughout are much the same in quality and size as have been reported for some time past.—La Salada. The work of sinking the shaft and the driving the No. 2 crosscut has begun to assume a more steady condition, and, although there has been some interruptions, they were less frequent, and it may be hoped, as the wet season is apparently terminating, that the whole of the operations will go on continuously. No. 6 level south remains unchanged, and north it has improved, although only slightly. The work above this level (points denominated in tabulated report) rising and stoping, has opened up better mineral within the past few days, but the improvement has not augmented the "diarios" in the mills to any extent yet. Some stoping has been done in the back of No. 4 level indiscriminately, and the ore extracted has shown a fair yield. There is no hope, however, of obtaining but a small quantity from these points, and are practically nothing more than portions of the vein left here and there by the tributaries in days past. The crosscut driven west from No. 4 level has intersected the lode, but it has not yet been driven through, it thus far shows well, and will probably be of considerable help if it maintains the size which it apparently has. More definite explanation will be given on this point in a future letter.—Cordoba. The several points at this mine show a slight improvement, taken in the aggregate. In the Rosario section north, the apparent junction of a vein with the main lode has effected a favourable change, but the united parts have not yet been opened on sufficiently to give a definite opinion of what they may be worth. The stopes in this section have produced a fairly good mineral, but the mill yield has slightly declined from last month. In this level south the stopes are much the same in quality, but there is a prospect from the appearances shown, that they will improve. It is pleasing to report a considerable advance in the No. 8 crosscut, the drivage for the month is 36 feet, the best record ever made in this mine in a similar work in the same class of rock. I take the opportunity to mention here that this is due mainly to the use of the explosives lately sent (dynamite), and may be considered a good drivage anywhere in such hard rock.—Tigrito. In No. 6 level west the lode is much the same as reported in my last letter, and the slight changes which occur occasionally are of little importance. Advances in this level in this direction are slow, and if possible they will be somewhat accelerated to open up more stoping ground. As the lode is small, and yields but little in quantity of mineral for the amount of ground worked.—Marmajito and Marmajor. There is very little change in these mines since my last. In the former, the branches of mineral mentioned as having been intersected by the No. 2 crosscut are being driven on, and are very promising in appearance, but the enclosing walls are excessively hard and adhere so firmly to the lode portion that a quantity of wall rock is unavoidably broken with it, and in segregating the substance extracted, too much of the wall rock goes to the mill and impoverishes the actual mineral portion, or part of the latter is discarded as débris. This state of things is not expected to continue long, and it may be hoped that soon the formation of mineral matter will carry with it a "selvage" (a thin, soft, decomposed substance usually found here and elsewhere between the lode and its enclosing walls), which will assist considerably the extraction of the pure mineral substance solely, and save the work of preparation. Apart from the points mentioned there is very little news to report. At the latter mine the crosscut is continued, but the advance made is slow, chiefly from the hardness of the rock driven into, and it is probable that some time will elapse before the mine will be in a condition to support the demand of the mill.—La Salada new mill. The erection of this progresses favourably; the timbers are rapidly being brought from the forest, and dressed equally so. Other work than carpentry which is needed to be done goes on slowly together. The parts of the machinery are beginning to arrive from Zaragoza, and if nothing unusual occurs they will be here in time to be mounted as soon as the timberwork is ready.—The Tias watercourse. This work has been commenced in earnest, and I have laid out portions along the line and at each end. The only matter which has interfered with the undertaking is the wet season, but this interference is gradually terminating, and I intend to hurry forward with the most difficult part of the work during the coming dry season. The advantages the water will be to the company are becoming more and more apparent, and the sooner it can be made use of the better. If we should be fortunate enough to bring it to La Salada before the new mill is ready, it can be used to run the stamp in the No. 1 Mill at San Esteban, or it can be separated from the Pocuna at El Bitumen, and join the water there and go on to Tigrito mill, and thence to Marmajito and Marmajor; also when the new mill is erected, and the combined waters shall be more than sufficient for the stamp, a part may be run on in the present watercourse to run the present arrastres at San Esteban; you will observe, therefore, that there are many uses which can be made of it, and consequently deserves all the attention it can possibly have.—La Salada, November 9. Silencio. Work in this mine has again been delayed owing to a very heavy breakdown on the Pocuna watercourse, which occurred on the 26th

of last month. The breakage was of such magnitude that it was found necessary to maintain some 400 men at work day and night until the water could be set running again, and this was accomplished on the day following. Sinking in the main shaft is now carried on with all possible dispatch. In the No. 6 level south the lode has become somewhat smaller, but still continues to yield rich mineral. The No. 6 level north having become so unproductive, the end was suspended and the men put to cross-cut east in search of a branch of the lode that we had in the hanging-wall some distance back in the level. The No. 5 level south continues in much the same ground, and in the No. 5 north we have also found it necessary to drive on a branch in the hanging. In the No. 4 north this mode of procedure has also been employed. All other points remain much the same.—La Salada. The sinking in this shaft has of course also been greatly delayed, even more so than in Silencio mine. In the mine itself there is little or no change. The new crosscut from main shaft is being pushed forward with all speed.—Cordoba. The drivage of the No. 8 crosscut is progressing as well as could be wished, the mineral from No. 7 level meanwhile keeping the mill well supplied.—Tigrito, Marmajon, and Marmajito. All work in these mines progresses well, and there is no change of any import to report.

**FORTUNA.**—Mine report, dated December 19: Canada Incosa Mine. In the 110 fathoms level driving west of San Pedro's shaft, the lode is small and poor.—Los Salidos Mine. The lode in the 200-fathoms level, driving east of Taylor's engine shaft, worth 4 ton per fathom. The lode is large but has fallen off in value. In the 105 east of Palgrave's shaft the lode is more open and looks promising.

**OREGUM.**—Superintendent's report for the fortnight ending December 4: Taylor's shaft. The 660 feet level south driven 19 feet 9 inches, total 30 feet 6 inches. Lode 3 feet wide, assay value 2 ounces 6 grains. This drivage is suspended awaiting the excavation of plat, which is commenced, and will be completed with all the dispatch possible. The 560 feet level south driven 18 feet, total 219 feet. Lode 1 foot 6 inches, value 1 ounce 2 dwts. 21 grains. No. 1 winze 560 feet level south sunk 6 feet 9 inches, total 39 feet 3 inches, lode 2 feet, value 1 ounce 3 dwts. 22 grains. No. 2 winze 460 feet level south sunk 4 feet 3 inches, total 93 feet. Lode 2 feet, value 2 ounces 3 dwts. 13 grains. The level north from back of No. 4 rise 280 feet level south driven 6 feet 3 inches, total 25 feet 9 inches. Lode 9 inches, value 1 ounce 5 dwts. Wallroth's shaft sunk 9 feet 9 inches, total 946 feet 6 inches. Lode 1 foot wide, assay value 10 dwts. 21 grains. The 860 feet level south driven 17 feet 6 inches, total 170 feet. Lode 1 foot 6 inches, value 1 ounce 2 dwts. 21 grains. No. 1 winze, 860 feet level south, sunk 5 feet 3 inches, total 29 feet 6 inches. Lode 2 feet, value 12 dwts. The 860 feet level north driven 14 feet 6 inches, total 120 feet 6 inches. Lode 6 inches, value 7 dwts. 15 grains. The 760 feet level south driven 13 feet 6 inches, total 315 feet 6 inches. Lode 9 inches, value 9 dwts. 19 grains. No. 1 winze 760 feet level north sunk 6 feet 6 inches, total 66 feet 3 inches. Lode 2 feet 6 inches, value 6 dwts. 12 grains. The 760 feet level south sunk 6 feet 6 inches, total 76 feet 3 inches. Lode 1 foot, value 4 dwts. 8 grains. The 660 feet level south driven 19 feet 6 inches, total 800 feet. Lode 3 feet 6 inches, value 1 ounce 5 dwts. 22 grains. No. 3 winze 660 feet level south sunk 4 feet 3 inches, total 81 feet 3 inches. Lode 6 inches, value 9 dwts. 19 grains. No. 4 winze 660 feet level south sunk 3 feet, total 48 feet. Lode pinched. No. 5 winze 660 feet level south sunk 4 feet 6 inches, total 31 feet 6 inches. Lode 4 feet, value 1 ounce 7 dwts. 5 grains. The 660 feet level south driving north from Taylor's shaft driven 17 feet, total 27 feet 6 inches. Lode 2 feet 6 inches, value 5 ounces 11 dwts. 1 grain. No. 7 winze 560 feet level south sunk 5 feet 6 inches, total 54 feet 6 inches. Lode 1 foot 9 inches, value 1 ounce 3 dwts. 22 grains. The 360 feet level north driven 11 feet 6 inches, total 343 feet 9 inches. Lode very small, no sample. The 280 feet level south from crosscut west driven 9 feet 9 inches, total 57 feet. Lode 2 feet, value 4 dwts. 8 grains. The 280 feet level north driving north on fold driven 19 feet, total 62 feet 9 inches. Lode 1 foot 2 inches, value 5 dwts. 10 grains. The 760 feet level north driven 12 feet, total 184 feet 6 inches. Lode 3 inches, value 6 dwts. 12 grains. No. 1 winze 760 feet level north sunk 6 feet 6 inches, total 66 feet 3 inches. Lode 1 foot, value 4 dwts. 8 grains. The 610 feet level south driven 13 feet 6 inches, total 99 feet. There is no change in the strata at this point calling for remark. The 510 feet level south driven 15 feet 9 inches, total 301 feet 9 inches. Lode 8 inches wide, value 10 dwts. 21 grains. No. 1 winze 510 feet level south sunk 8 feet, total 41 feet. Lode 2 feet 3 inches, value 8 dwts. 17 grains. Low's shaft sunk 5 feet, total 644 feet 4 inches. The 610 feet level south driven 17 feet 6 inches, total 16 feet. The 950 feet level south driven 17 feet 6 inches, total 286 feet. Lode 4 inches wide, value 8 dwts. 17 grains. No. 1 winze 950 feet level south sunk 6 feet, total 31 feet. Lode 1 foot, value 2 ounces 6 grains. No. 1 winze 950 feet level north sunk 5 feet, total 78 feet 6 inches. Lode 4 inches wide, value 13 dwts. 2 grains. The 650 feet level driving east from shaft for balance bob plat driven 4 feet 8 inches, total 16 feet 8 inches.—No. 2 trial shaft. The 250 feet level south driven 6 feet 6 inches, total 99 feet. Lode 1 foot 3 inches, value 5 dwts. 10 grains. The 250 feet level north driven 6 feet 9 inches, total 108 feet 9 inches. Lode 4 feet wide, value 19 dwts. 15 grains.—Stones for month. Taylor's shaft. Back of 460 feet level south stopped 23½ fathoms. Lode 4 feet 6 inches wide, assay value 7 dwts. 23 grains. Bottom of 360 feet level south stopped 63½ fathoms. Lode 3 feet 9 inches, value 1 ounce 6 dwts. 12 grains. Bottom of 280 feet level south stoped 13½ fathoms. Lode 3 feet 4 inches wide, value 2 ounces 3 dwts. 4 grains. Bottom of level south from No. 4 rise, back of 280 feet level south, stopped 10½ fathoms. Lode 2 feet wide, value 2 ounces 8 dwts. 23 grains.—Wallroth's shaft. Back of 660 feet level south stopped 22½ fathoms. Lode 2 feet 6 inches wide, value 1 ounce 8 dwts. 7 grains. Bottom of 660 feet level north stopped 6½ fathoms. Lode 2 feet 6 inches wide, value 1 ounce 1 dwt. 6 grains. Bottom of 560 feet level south stopped 10 fathoms. Lode 3 feet 6 inches wide, value 2 ounces 2 fathoms. Lode 1 foot, value 8 dwts. 17 grains. Back of 560 feet level south stopped 22½ fathoms. Lode 2 feet 6 inches wide, value 2 ounces 19 grains. Bottom of 560 feet level north stopped 6½ fathoms. Lode 1 foot 9 inches wide, value 17 dwts. 10 grains. Bottom of 460 feet level south stopped 28½ fathoms. Lode 1 foot 9 inches wide, value 19 dwts. 17 grains. Bottom of 460 feet level north stopped 5½ fathoms. Lode 1 foot 4 inches, value 1 ounce 13 dwts. 19 grains. Bottom of 360 feet level south stopped 23 fathoms. Lode 2 feet 6 inches wide, value 2 ounces 8 dwts. 23 grains. Bottom of 215 feet level north stopped 11 fathoms. Lode 1 foot wide, value 17 dwts. 19 grains. Bottom of 215 feet level north stopped 13 fathoms. Lode 2 feet 6 inches wide, value 2 ounces 4 grains. Back of 360 feet level south stopped 5½ fathoms. Lode 2 feet wide

**APPANTOO.**—Report from mine captain for October, dated November 6:—Cawston shaft. Have cut the lode at a distance of 70 feet from shaft. Cannot say what size it is as we are only into reef as yet 2 feet, but am pleased to state we get excellent prospects from stone already taken out. Have not had any to equal it yet from any other part of your mine.—Swift's adit. Am working here all the time day and night going towards Cawston shaft, with a view to getting as quickly as we can on to that shute of stone from which you got such good returns before the working caved in last year.—George's adit. Nothing fresh to report.—Essians east. This is not yet finished timbering.—Adit shaft. Have put in crosscut 10 feet towards reef. Still in hard grey sandstone; needs no timbering, but will have to timber the shaft for the purposes of ventilation, ladder ways, and guides for cage which is now being made.—Essians west. Nothing done here during the month.—Thompson's tunnel. Contractors have driven another 10 feet during the month.—Worgent's tunnel. Contractors have driven 30 feet for month, and we have one shift of boys timbering and carry on leading stope.—Remarks. We have sent about 800 tons of ore to mill, but there was a lot of mullock mixed with it from falls, &c., that could not very well be extracted. Size of reef in all parts about the same as previous month.—Thomas Worgent.

**ASSAM RAILWAYS AND TRADING.**—Mr. C. B. Rosenplaenter, the expert, sent out in June last to report on the petroleum venture, writes from Margherita, under date 19th October, to say that eight wells have been sunk, and only one has proved unproductive. Every single other well has been a success, and if two of these can be taken as a criterion, there is not the slightest doubt of there being an assured and not easily exhausted supply of oil for many years to come. The wells do not tap each other, and their production is a steady one. Under these circumstances, Mr. Rosenplaenter does not hesitate a moment to recommend the immediate construction of an adequate petroleum refinery. Acting on this recommendation, the directors have decided to send out, as early next year as possible, a complete refining plant of the most modern description.

**BALKIS EERSTELING.**—Extract from our manager's letter at Eersteling, dated November 28:—The reef is carrying a large quantity of iron pyrites; we have driven from 3 to 4 feet during the week; visible gold is at times showing itself, and the pannings are extremely satisfactory. Altogether I have proved the reef for some 6 feet from the point where I commenced to work. I have had to increase the number of Kaffirs in order to open up the reef as quickly as I possibly can. For the above distance decidedly good pannings have been made, and I trust that the present bright prospect will continue. Several men who have seen the reef rock like it very much indeed, and, so far as my experience goes, I am quite satisfied that if it continues as it is at present, we shall soon have the mill and work and be returning gold. In conclusion I beg to state that the reef is looking extremely promising, and it has a decidedly permanent appearance. Crushed sample No. 1 yielded 1 ounce 5 dwts., crushed sample No. 2 yielded 8 dwts., crushed sample No. 3 yielded 3 ounces 16 dwts., 12 grains, crushed sample No. 4 yielded 7 ounces 17 dwts.

**BRITISH BROKEN HILL PROPRIETARY.**—Mining manager's report for the week ending November 15:—Blackwood (No. 1) shaft 150 feet level. East crosscut extended 20 feet, we broke in crosscutting 12 tons carbonates ore averaging 50 per cent. lead and 6 ounces silver per ton.—Howell (No. 2) shaft, 300 feet level. North-east drive driven 7½ feet.—Marsh (No. 6) shaft, second level. No. 3 east crosscut lengthened 16 feet. Have started a crosscut from uprise in north drive for purposes of ventilation, and connection with north stope over back of main south drive. The winze in south drive off No. 3 east crosscut is sunk 9 feet. We broke 6 tons, averaging 19 per cent. lead, and 20 ounces silver per ton.—Stopes. From north stope over main south drive we broke 8 tons, averaging 31 per cent. and 44 ounces, and 7 tons 23 per cent. and 18 ounces silver per ton. From stope down winze we have broken 27 tons, averaging 32 per cent. and 66 ounces, 10 tons 26 per cent. and 48 ounces, and 7 tons 23 per cent. lead and 18 ounces silver per ton.—Ratcliffe's, North drive from winze is lengthened 12 feet, we broke 16 tons averaging 21 per cent. lead, and 8 ounces silver per ton. From 115 feet level we broke 20 tons, averaging 35 per cent. lead, and 33 ounces silver per ton. The assays for the week vary from 16 to 62 per cent. lead and from 49 to 3112 ounces silver per ton.

**CRAVEN'S CALEDONIA.**—The following fortnightly report has been received from the mine, dated Charters Towers, December 27: In the underhand stope from No. 9 level, the reef will average about 10 inches in thickness.—No. 9 level had been extended a further 3 feet, making a total of 313 feet from the fault. The reef in this level is split a little at present, but in the first two stope it is about 6 inches, in the next two about 5 inches, and in the other one about 7 inches. The drive started in the No. 8 level on the fault mentioned in my last report has been extended 24 feet, and the ground is very fair for driving. The haulage of quartz for the fortnight is 46 tons, of which 9 tons have been taken to the mill, leaving 37 tons in the paddock.—At the Victoria and Queen shaft, I started a drive at the 606 feet level on the 2nd instant with two men—one in each shaft, and it has been extended 4 feet, making a total of 78 feet from the straight shaft. On the Victoria and Queen reef, in the underhand stope the reef is about 9 inches thick. In the leading stope over the eastern level, the reef is split up a little, but will average altogether about 1 foot thick. No. 2 stope has 8 inches; No. 3 stope is a little smaller, and the next two will average 8 inches. The haulage of quartz from this shaft for the fortnight is 36 tons.—(Signed) G. Cabassi.

**CHIAPAS.**—Mine report for fortnight ending November 15: We continue to be still greatly retarded by insufficient rainfall, at the present moment our underground works are full of water, and not a drill running in the mine. Our pipe line is now all but finished, to-day we have turned on the water as a preliminary test, under a head of 410 feet; she is standing well, but will need some going over yet to secure any possible weak places. The compressor pump has arrived at the head of our river, navigation and transport of same overland will be undertaken at once. I am, therefore, hopeful we may have all running this year. Providencia Aver driven 14 feet 6 inches, total 182 feet 6 inches; shows a slight improvement. Sylva crosscut driven 12 feet, total 55 feet; no change. Taylor crosscut north-east driven 8 feet, total 146 feet 6 inches; discontinued. Providencia south hill crosscut No. 2 driven 7 feet 6 inches, total 159 feet; no change. Taylor main extension, driven 16 feet, total 533 feet. We are here apparently in a crosscourse of dyke rock, showing angular boulders of syenite in it, and have discontinued until we are able to put a rock drill on it. Copper Creek crosscut No. 2 driven 2 feet 6 inches, total 95 feet. When holed through into Santa Fe stope we shall commence sinking a winze in the Aciga drift. Santa Fe hill drift No. 3, driven 3 feet 6 inches, total 13 feet 6 inches; in Wollastonite formation. Jardin crosscut, driven 5 feet, total 19 feet; no change. Taylor main drift west No. 2, driven 4 feet, total 68 feet; recommenced driving.—Extraction. Old Providencia 202 tons. Assay value 16 dwts. gold; 8 ounces 14 dwts. silver; 562 per cent. copper. Continues of good quality. Santa Fe hill 304 tons. Assay value 1 ounce gold; 8 ounces silver; 4.18 per cent. Continues of good quality. Santa Fe stope 424 tons. Assay value 2 ounces 1 dwt. gold; 5 ounces 7 dwts. 12 grains silver; 2.88 per cent. copper. Improved above its ordinary good quality. Taylor No. 3 55 tons. Assay value 10 dwts. gold; 8 ounces 6 dwts. silver; 3.63 per cent. copper. Good ore.

**MOUNT ZEEHAN (Tas.).**—Manager reports for week ended 13th November:—Argent's section main engine shaft, No. 6 lode, 72 feet level, No. 3 rise. Stopping continued, but as mill is undergoing thorough overhaul no ore has been raised. Lode is from 10 inches to 3 feet wide carrying fair seconds.—No. 4 lode. Stope south of rise continued. Lode 1 foot wide, medium quality seconds.—Silver Queen section. The principal work has been removing and erecting poppet heads at new shaft.—Tributaries. At Argent section the No. 2 tributaries have got their pump to work, and in three weeks time should cut the lode at 50 feet, which is the limit of depth of their tribute.—Concentrators. Have made a thorough overhaul of the mill building and machinery, and restarted crushing on the 10th instant.

**No. 7 NORTH-EAST QUEEN.**—The following fortnightly report has been received from the mine, dated Charters Towers, Nov. 10:—

During the fortnight Perry and party have continued stoping over the intermediate level on a reef from 3 to 12 inches in thickness for a distance of 10 feet along the stope. Goninan and party are at present crushing. Total amount of stone raised during the fortnight 15 tons.—(Signed) H. Davis. Owing to the poor returns from the mine the directors are about to apply for six months' total exemption.

**NAMAQUA COPPER.**—Abstract of superintendent's report for October; Tweefontein Mine, 125 fathom level east. This level produces good stones of ore occasionally, and looks likely to improve.—115 fathom level east. The lode has improved. The level is now being driven 9 feet wide by 9 feet high, and is opening up good stoping ground. Worth 6 tons of ore per fathom.—115 fathom level west. Some very good quality ore has been found in the bottom of the level, and further improvement is expected.—105 fathom level east. This driving shows an improved appearance.—105 fathom level west. There is no improvement at this point.—95 fathom level west. There is very little change here. The lode is about 6 feet wide. Stoping ground is being opened up, of which there is a great length in this direction. Worth 6 tons of ore per fathom.—95 fathom level west, No. 28 winze. This winze has been holed to 105, and is worth 3 tons of ore per fathom.—85 west. Lode here is massive, and contains copper ore throughout. Worth 3 tons of ore per fathom.—New shaft, 25 fathom level west. The driving here is carried 12 feet by 12 feet, and is passing through a good body of ore. Worth 11 tons of ore per fathom.—25 fathom level west cross cut south. This is being driven to prove the depth of the ore body. Worth 10 tons of ore per fathom.—25 fathom level east, 1 winze. This winze having reached a depth of nearly 11 fathoms, has been suspended. Worth 10 tons of ore per fathom.—35 fathom level east. Although this driving shows very rich ore, it is suspended *pro tem*, owing to the difficulty and expense of getting away the stuff. Worth 8 tons of ore per fathom.—Stopes, 105 fathom level west (back of); and 95 fathom level west (bottom of). Both these stope continue to yield the usual quantity of ore, viz., 10 tons, and are looking well.—No. 4 shaft. This shaft is west of No. 2, and will go down about 15 fathoms, which distance will probably be driven by the time the No. 2 shaft reaches that depth.—Shipping, the *Wandoo* arrived at Swansons on the 23rd November, with about 1,050 tons of ore. The *Golconda* arrived at port Nolloth to load on the 14th December. Output for November, 500 tons of ore at 30 per cent.

**NEWHOUSE TUNNEL COMPANY.**—The managing director (Mr. Samuel Newhouse) writes from Denver, December 4: We have driven 222 feet of the tunnel during the month of November. We encountered perhaps the hardest rock we have ever been in, and everything considered, I am satisfied with the showing, although I had hoped that we would have made 40 or 50 feet more with the two shifts we are now working. A telephone from my superintendent this morning reports the rock changing for the better, and he says we are making better headway. I hope so for I shall not feel satisfied until our two shifts are making 300 feet a month. I have a new deal on with reference to getting out the rock; am now doing it with Italian contract labour. We have not perfected our air arrangements yet. This week I bought a new blower and engine, and expect to have it in operation within the next 10 days. This feature will also contribute a great deal towards facilitating the making of headway in future driving; and again on December 8: Our rock is a little softer now; we are making 9 feet a day.

**SUTHERLAND REEF.**—Manager writes November 29: Winze, 150 feet level east has been sunk 58 feet, and is now connected with the 210 feet level. We shall commence driving east on this level in a day or two. West drive, 210 feet level has been driven 130 feet. There has been great improvements here since last report. The reef is about 2 feet wide in quartz, carrying good gold. Winze, 210 feet level west has been sunk 24 feet. There is great improvement here also since last report. The reef is about 3 feet wide of grayish quartz, and carrying a good deal of visible gold.

**COROMANDEL.**—Superintendent's report for fortnight ending December 1: Coromandel shaft, 420 feet level north. Driven since last report 21 feet, its total length being now 472 feet 6 inches. Lode is still very small, but the walls are well defined, and the appearance of the end is rather more favourable than when last reported.—Rise back 440 feet north. This is being worked by hand labour, and is now 14 feet above the drift. Lode 1 foot 3 inches wide, containing visible gold and assaying 15 dwts. per ton.—Winze bottom 320 feet north. Lode 10 feet wide, value 10 dwts. per ton. Sunk 10 feet, total 33 feet under level.—210 feet crosscut east. This has been driven a further 16 feet 6 inches and suspended. The end is now 113 feet from former drift. Nothing has been discovered beyond the branches previously reported. It is our intention later on to resume the drivage north on the most promising of these, but for the present this drift will be employed in an exploratory crosscut west of shaft.—Prospect shaft, 500 feet level north, winze in bottom at north end. This has been sunk by hand labour 8 feet 6 inches, and the lode which was 1 foot wide at starting is gradually opening out, while maintaining its value of from 8 to 10 dwts. of gold per ton. 500 feet level south driven 26 feet, total 194 feet from shaft. The quartz has entirely cut out in this level, and the ground being very hard and unpromising, the drivage is suspended.—500 feet crosscut west. This has been extended a further 17 feet 6 inches, making its total length 221 feet 9 inches. No quartz has yet been discovered, but there is a marked change in the character of the schist, and we are now within 40 feet of the calculated position of the lode as seen at surface. 440 feet level, north of cross cut east, driven 20 feet, total 32 feet. Lode in end 1 foot 6 inches wide, assaying 1 ounce of gold per ton, and improving in size and appearance. 440 feet level, south of cross cut east, driven 27 feet 3 inches, total 113 feet 3 inches. Lode 1 foot 6 inches wide, assaying 2 ounces 4 dwts. of gold per ton. Total length opened in this shoot 150 feet, average width 1 foot 6 inches, average assay value 1 ounce 4 dwts. per ton.—Rise back 440 north. This rise is on lode west of dyke, and is being worked by hand labour. Progress for fortnight 4 feet 3 inches. Size of lode 1 foot, assay value 1 ounce per ton.

**HARRIETVILLE.**—Superintendent's report for fortnight ending November 9:—Mons Meg Mine. Drive south of winze 100 feet below tunnel D advanced 22 feet, total 130 feet. Lode formation continued wide, but generally poor, although there is a vein 10 inches thick on west side of drive, which carries visible gold. We intend crosscutting into the footwall as soon as convenient.—Stopes. Lode in stope at back of 240 feet level below tunnel J 18 inches wide, and assaying 1 ounce per ton. Stope at back of 100 feet level below J, lode has become poor, and work has been suspended. Underhand stope below tunnel J, lode averages 2 feet wide, and assays as much as 2 ounces 15 dwts. per ton. This stone is unfortunately of limited extent. Lode in stope at back of tunnel D 12 feet wide, assaying 3 dwts. per ton.—Saint Bernard Mine. We have secured the Pennsylvania shaft at the upper tunnel, and sank a winze on the eastern side of it to a depth of 26 feet, from which point we are now crosscutting towards the rich vein. In the bottom tunnel we are preparing to drive north of No. 2 crosscut, on a lode which to all appearances is the continuation of the "United Miners."—Surface. For some time past a man has been employed to prospect the surface. Lately he has been driving a tunnel east of the Guerdon lease in order to intersect a shoot of gold which formerly yielded very fair returns near the surface. This shoot has just been reached, the vein of quartz being six inches wide, and showing gold freely. It is not sufficiently developed to enable one to estimate its value.

**MOUNT LYELL.**—The London office has received the following report from the Melbourne board for the week ending November 8, 1894:—South drive, 50 feet level, engine shaft, No. 4 tunnel. The south drive has been advanced 5 feet, total 227 feet. The country is schist rock; tight for breaking.—North drive, 50 feet level, engine shaft, No. 4 tunnel. The north drive has been advanced 2 feet, total 199 feet. The country is baryta and flinty rock; very tough.—No. 2 crosscut, 75 feet level, engine shaft, No. 4 tunnel. Stope in the various faces has been continued, and ore broken, as usual.—North drive, 100 feet level, engine shaft, No. 4 tunnel.—The north drive has been advanced 5 feet, total 58 feet. The rock is still intensely hard and difficult to blast.—No. 5 tunnel. The contractors have driven 9 feet, total 889 feet. The rock for the past three shifts has been much better for breaking, and if it continues better

progress should be made.—Ore raised. During the past week 314 bags of ore, weighing 19 tons 12 cwt. 2 qrs., and containing 9812 ounces silver and 3 tons 12 cwt. 2 qrs. 12 lbs. copper, have been raised, bagged, and sampled.

**KEMPINKOTE.**—Fortnightly mine report dated December 3:—Garland's shaft. During the past fortnight we have completed the cutting of the bottom plat, put in both top and bottom sills, and have sunk 7 feet, total depth from surface 262 feet. There is no change in the ground in the bottom of the shaft. 245 crosscut east has been driven 11 feet 8 inches, total distance from shaft 36 feet. Lode in the end the full width of the drive, assaying 4 dwts. 12 grains of gold per ton. 183 north drive has been driven 32 feet, total distance from crosscut 151 feet. About 140 feet from crosscut we met with the footwall composed of a good-looking schist dipping west at an angle of about 75°. The lode upon it is a very strong looking lode the full width of the drive with an average assay of 6 dwts. of gold per ton.—183 south drive has been driven 14 feet, total distance from crosscut 318 feet. The lode matter which appeared in the east corner of this drive did not amount to very much. We have suspended the drivage for the present and started a cross cut west about 6 feet from the end, which we will call No. 3 west cross cut. No. 3 west cross cut has been driven 9 feet, total distance from level 9 feet. We have passed through a few stringers of white quartz, very poor. The end is in schist. No. 1 winze has been sunk 4 feet 9 inches, total depth 17 feet 6 inches. Lode in the bottom the full width of the winze, assaying 12 grains of gold per ton of stuff. Henty's shaft has been sunk 9 feet, total depth from surface 249 feet 3 inches. The ground in the bottom is still very hard and spare for sinking. 173 north drive has been driven 4 feet, total distance from shaft 20 feet. There is lode matter in the end the full width of the drive, but only assays a trace of gold per ton of stuff. 173 south drive has been driven 25 feet, total distance from shaft 257 feet. About 243 feet from shaft we met with the footwall, which is similar to that in the 183 north drive Garland's shaft. The lode upon it has a masterly appearance, and assays 3 dwts. 12 grains of gold per ton. Our pitwork and surface machinery are doing good duty.

**MONTANA.**—Mining report by Mr. R. T. Baylies. The following summary covers the most important features of the development conducted during the past two months:—The Drumlummon lode. The 500 feet level. A small body of low grade ore has been developed about midway between No. 1 and No. 2 shafts. —The 900 feet level. A cross cut from No. 1 shaft has been advanced 45 feet, with the development of the New Castletown vein. At a point about 35 feet from the shaft, this crosscut entered milling ore, which is probably included in the Drumlummon lode.—The 1000 feet level. The cross lode passing through the Drumlummon, south of No. 1 shaft, has been developed some distance in its easterly course, but having proved unproductive this work has been suspended. At an early date the No. 1 south shoot and the New Castletown veins will be sought for on this level.—The 1500 feet level. The west crosscut is now advanced to a point 300 feet distant from No. 1 shaft, and since passing through the Drumlummon lode, has been driven entirely in country rock. This crosscut will be continued on the chance that the North Star lode may be persistent to this depth. The east crosscut has reached a point 195 feet from No. 1 shaft, and is now in the locality wherein the New Castletown lode should exist, providing the known dip of that lode at the 700 feet level is maintained to this depth. It is not safe, however, to assume this to be the case, and it is possible that the New Castletown vein, if present at this depth, may yet be some considerable distance in advance of this crosscut.—The New Castletown lode, the No. 3 level. A new discovery of promising importance has been made in a prospect drift run south from the middle, or main New Castletown ore body, at a point about 60 feet over this level. This new ore body is now penetrated a distance of 59 feet, the first 29 feet being low grade, averaging \$8 gold and 6 ounces silver per ton; and the remaining 30 feet being high grade, averaging fully \$25 gold and 40 ounces silver per ton. The average width of this ore body is 9 feet, and the drift is still advancing in high grade ore.—The 400 feet level. The south ore body has now been undercut for a length of 100 feet, and possibly extends some little distance further, the average width being about 5 feet. It is particularly difficult to place an average value upon this ore body either on this level or the levels beneath, as the irregular occurrence of very high grade ore renders accurate sampling impossible, but it may be safely assumed that the average value is \$15 gold and 10 ounces silver per ton.—The 500 feet level. The south ore body is here undercut for a length of 160 feet, and also possibly extends still further south; the width is about 8 feet and the grade of ore at present exposed somewhat higher than in the 400 feet level.—The 600 feet level. The north drift has reached a point 40 feet north of the junction of the New and Old Castletown veins, but has not, as was expected, encountered the body of pay ore formed in the 500 feet level at the junction of these two lodes. The face of the drift now shows 14 feet of quartz of favourable appearance, and it is possible the ore body worked above may still be to the north of the present workings, if not it has probably been intersected by this drift at a barren point, as was the case with the middle ore body in this level and will be proved, should this alternative alone remain, by an uprise. The south ore body on this level has been undercut for 110 feet, and the forepart of the drift is still advancing in order. The width is not yet determined, and the value is uncertain, but from daily samples should be estimated as of somewhat lower grade than in the 500 feet level.—The 700 feet level. Going southward this level, and about 80 feet north of the probable position of the south ore body the New Castletown and Drumlummon lodes appear to unite making an ore body at present about 25 feet wide, averaging roughly \$10 per ton. As this ore body is a very recent discovery it is not possible to express definite opinions of its importance. This drift will be continued south to undercut the south ore body.—The 800 feet level. This drift has now been exposed somewhat higher than in the 500 feet level.—The 900 feet level. Going southward this level, and about 80 feet north of the probable position of the south ore body the New Castletown and Drumlummon lodes appear to unite making an ore body at present about 25 feet wide, averaging roughly \$10 per ton. As this ore body is a very recent discovery it is not possible to express definite opinions of its importance. This drift will be continued south to undercut the south ore body.—The 1000 feet level. This drift has now been exposed somewhat higher than in the 500 feet level.—The 1100 feet level. Going southward this level, and about 80 feet north of the probable position of the south ore body the New Castletown and Drumlummon lodes appear to unite making an ore body at present about 25 feet wide, averaging roughly \$10 per ton. As this ore body is a very recent discovery it is not possible to express definite opinions of its importance. This drift will be continued south to undercut the south ore body.—The 1200 feet level. This drift has now been exposed somewhat higher than in the 500 feet level.—The 1300 feet level. Going southward this level, and about 80 feet north of the probable position of the south ore body the New Castletown and Drumlummon lodes appear to unite making an ore body at present about 25 feet wide, averaging roughly \$10 per ton. As this ore body is a very recent discovery it is not possible to express definite opinions of its importance. This drift will be continued south to undercut the south ore body.—The 1400 feet level. This drift has now been exposed somewhat higher than in the 500 feet level.—The 1500 feet level. Going southward this level, and about 80 feet north of the probable position of the south ore body the New Castletown and Drumlummon lodes appear to unite making an ore body at present about 25 feet wide, averaging roughly \$10 per ton. As this ore body is a very recent discovery it is not possible to express definite opinions of its importance. This drift will be continued



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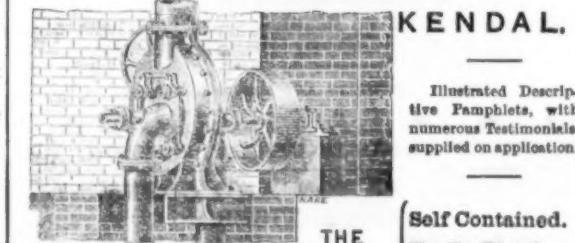
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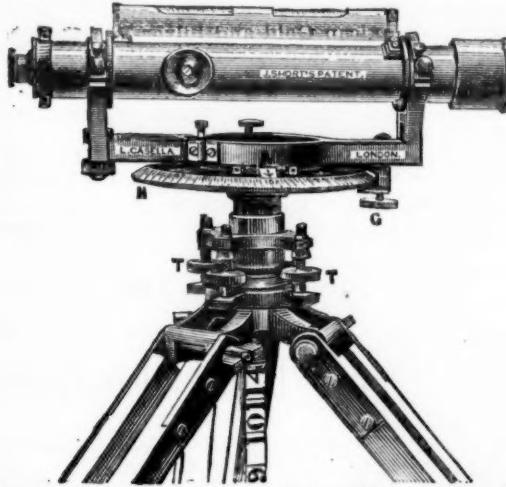
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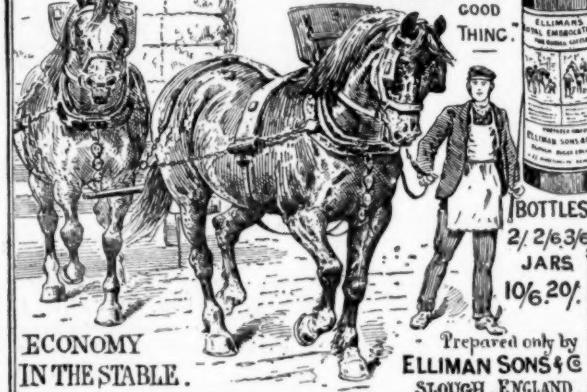
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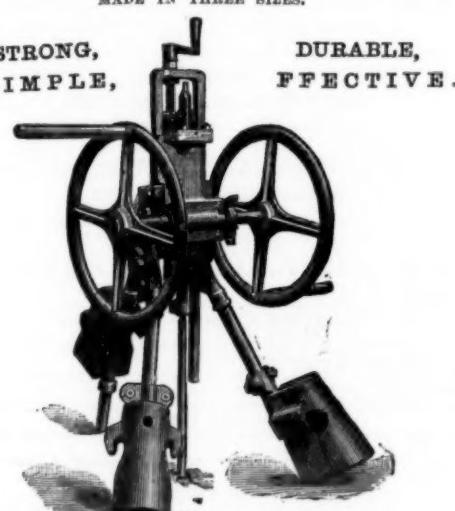
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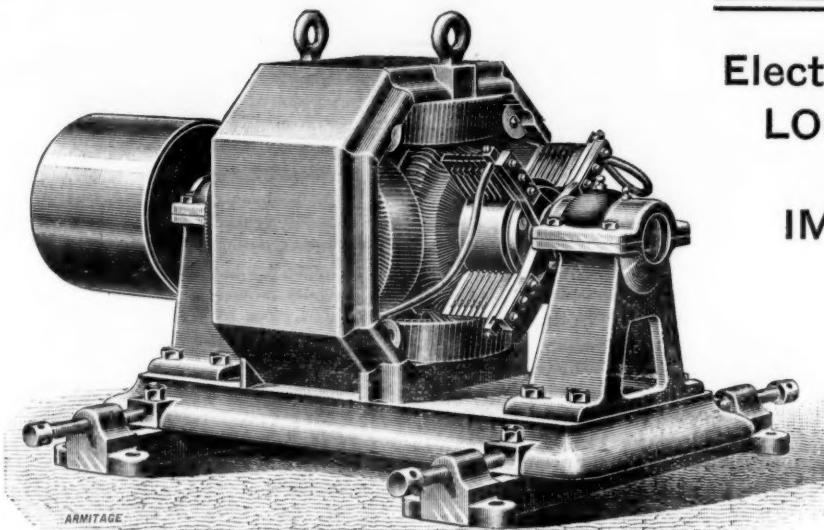
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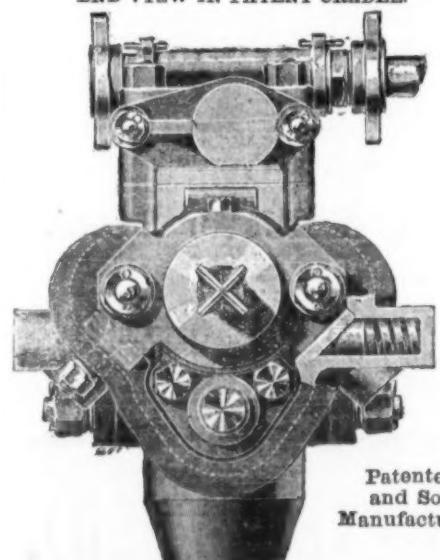
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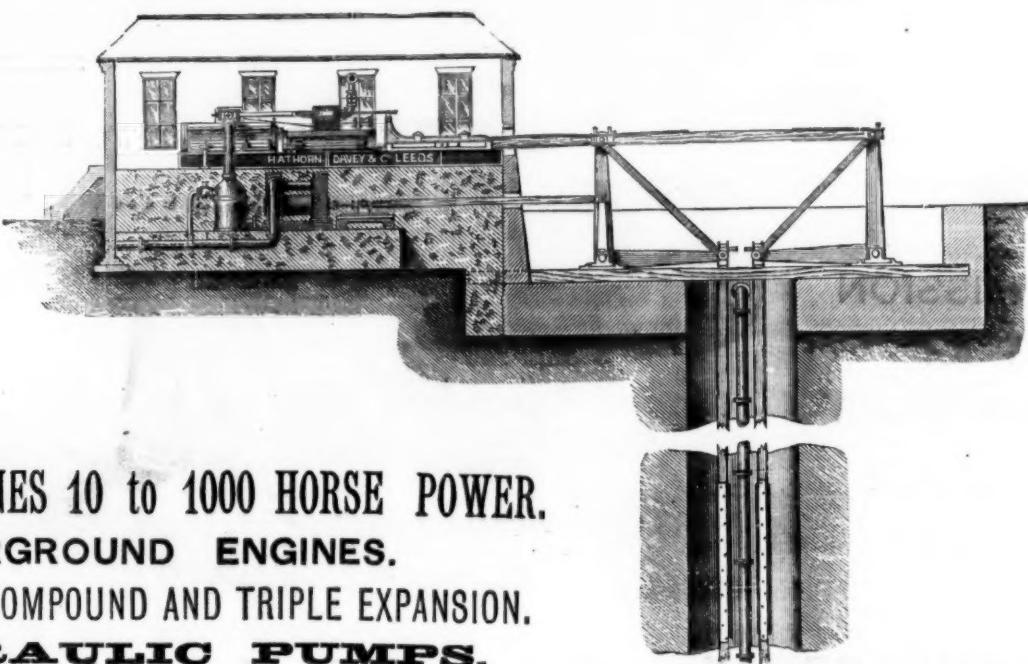
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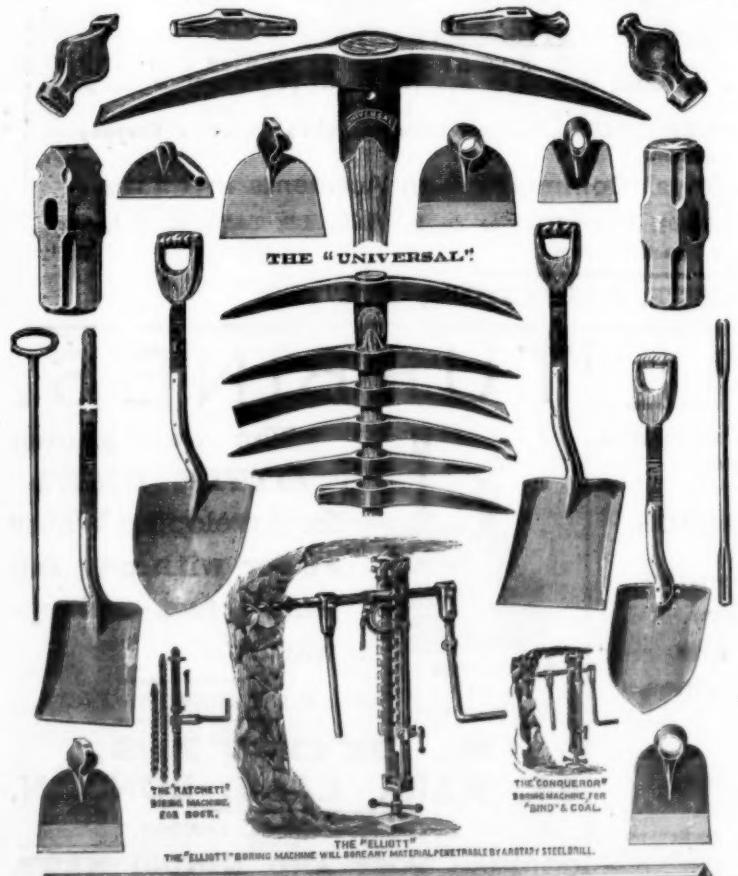
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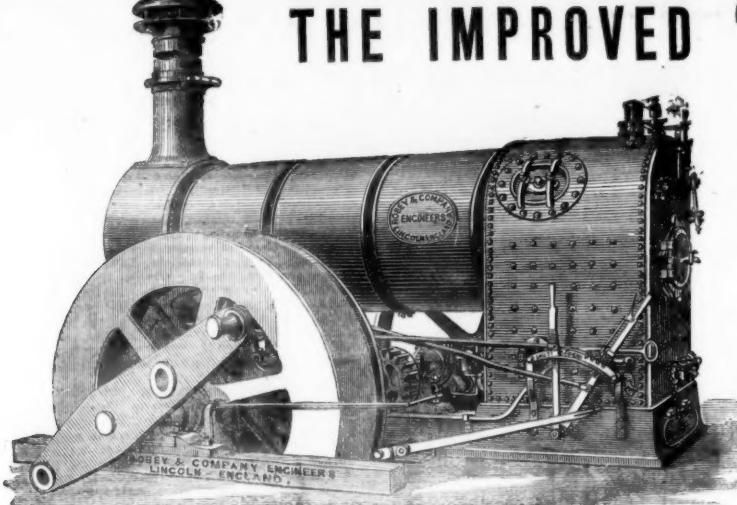
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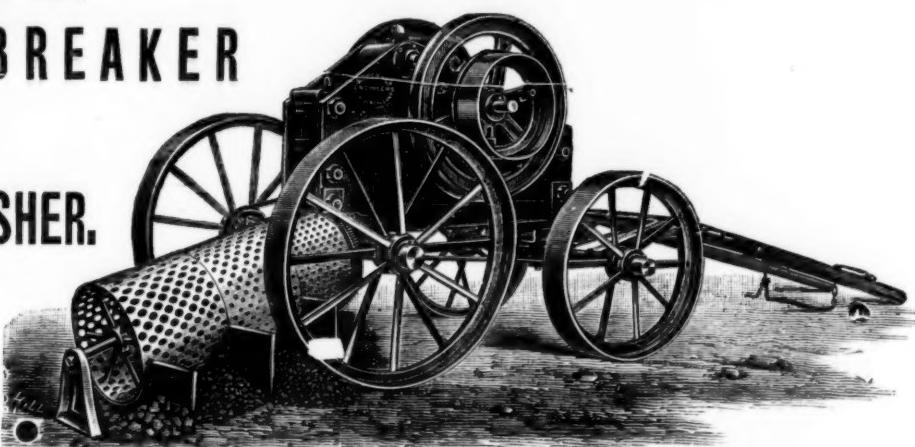
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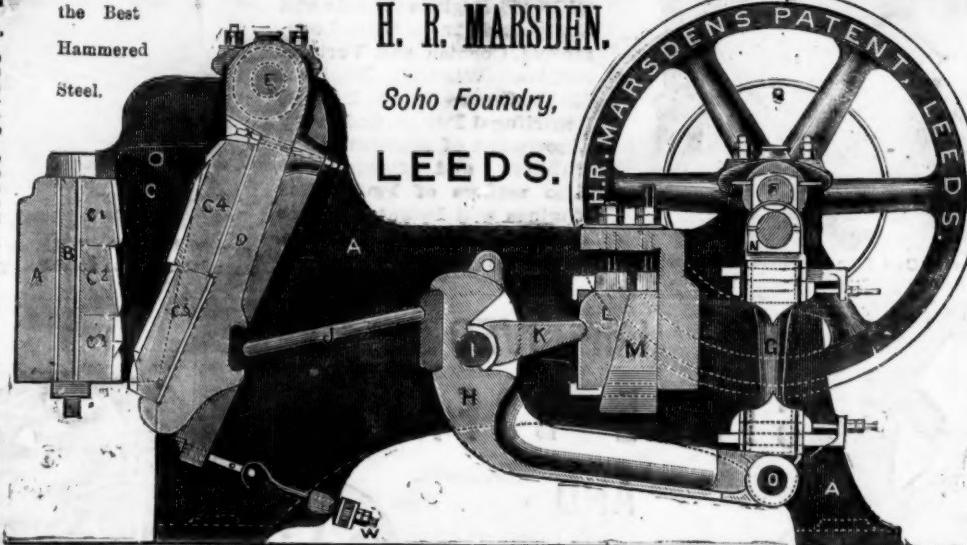
"I now order three of your Stone Crushers, &c to 15 by 10, to be of your very best construction, and to include two extra sets of Jaws and Cheeks for each. The last two 24x13 machines you sent me, which are at work in this colony, are doing very well. You will soon find that the railway contractors will adopt your machines in preference to the colonial ones—two of which I have. I know other contractors have had as many as nine of them, which have not given very good satisfaction. Once they know of yours thoroughly, I believe you will do a good trade with the colonies. For reference of the high character of your constructions you can refer to me as having used them with the very best results, both in New Zealand and this colony, and much prefer them to the colonial article, both in point of construction and liability to go out of order. The material we are crushing is very hard blue stone, for railway ballast purposes. Push on with the order as quickly as possible. I do not think it necessary to have any engineering inspection. I have brought your machines prominently under the notice of all large contractors in this colony, likewise the Government. Many of the contractors have spoken to me in reference to their capabilities, and could only tell them that they are by far and away the best and most economical I ever used. The very fact of me having purchased eleven from you at various intervals and various sizes, and two above 12 years ago, and having tried all the other makers is sufficient guarantee of the capabilities and the working of your machines. Yours in every way surpass all others."

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